

SOCIO-ECONOMIC FACTORS AND NUTRITIONAL STATUS OF CHILDREN IN  
RURAL INDONESIA

By

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# DECLARATION

Except where otherwise indicated  
this thesis is my own work.

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## ABSTRACT

The objective of this study is to examine how the nutritional status of children aged under five years is affected by demographic and socio-economic characteristics, and the knowledge, attitude and practice of mothers toward the Family Nutrition Improvement Programme. To achieve this, a case study was conducted in two Central Java Villages. The respondents in this study were 147 mothers who had children aged under five years and whose children possessed a growth monitoring card. The mothers were interviewed to obtain information on their demographic and socio-economic characteristics, and on their knowledge, attitude and practice of the programme. The weight and age of the youngest child in each family were taken from the child's growth monitoring card. The weight-for-age of the child was treated as an indicator of the nutritional status.

This study gathered information on socio-economic factors such as mother's education, mother's occupational status, father's education, family income, family wealth, and size of house. The demographic characteristics are age of child, sex of child, number of siblings under five and number of living children. Variables used to measure the mother's knowledge, attitude and practice are duration since joining the programme, attendance at the nutrition education sessions, child weighing and receiving food supplements.

The findings of this study are that more siblings under five and more living children in a family, especially among working-mothers tended to affect negatively the children's nutritional status. Income and family wealth were less likely to affect the children's nutritional status. However, most mothers in this study were actively involved with the programme's activities. Most children under five were weighed regularly and regularly received food supplements. However, the effect of these two activities on the children's nutritional status is not clear. Furthermore, most mothers regularly attended the nutrition



education sessions. This tends to indicate a positive effect on the children's nutritional status, and suggest the continuation of this aspect of the programme will probably be worthwhile for the improvement of the children's nutritional status in the future. In addition, the mother's occupational status (working or non-working) and mother's education seem to be essential considerations for the continued operation of the programme.

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## CHAPTER 1

### BACKGROUND OF STUDY AND LITERATURE REVIEW

#### 1.1 Introduction

The infant mortality rate in Indonesia has decreased sharply from an estimated 145 infant deaths per 1000 live births in 1961 to about 85 per 1000 live births in 1983 (Central Bureau of Statistics [CBS] and UNICEF, 1984). However, the current infant mortality rate is still two to three times higher than the levels in some neighbouring ASEAN countries. In the Philippines, for example, the current infant mortality rate is estimated at 50 infant deaths per 1000 live births in 1983. In Thailand it is about 48 per 1000, while in Malaysia it is about 30 per 1000 and in Singapore only about 9 infant deaths per 1000 live births (Grant, 1986).

Two of the most important variables which appear to be related to infant and child mortality rates in Indonesia are low birth weight and malnutrition during the second to fifth years of life. Between 1979 and 1983, it was estimated that about 14 per cent of children weighed less than 2500 grams at birth (CBS and UNICEF, 1984). Twenty seven per cent of children aged under five years are estimated to suffer from mild/moderate malnutrition.

In comparison to Malaysia and Singapore, Indonesia has a higher proportion of infants with low birth weight. Between 1979 and 1983, 11 per cent of infants in Malaysia had a low birth weight (less than 2500 grams), and in Singapore only 7 per cent of infants had a low birth weight. However, the proportion of infants with low birth weight and children suffering from mild/moderate malnutrition is lower in Indonesia compared to the Philippines and Thailand. In the Philippines, between 1979 and 1983 about 20 per cent of infants had a low birth weight. Between 1975 and 1983, 40 per cent of children under five suffered from mild/moderate malnutrition. In Thailand, in the same period, 38 per cent

of infants had a low birth weight and about 34 per cent of children under five suffered from mild/moderate malnutrition (Grant, 1986).

Nearly half of all deaths per annum in Indonesia occur to children aged under five years. Nutritional deficiency has been identified as an associated cause in 16 per cent of the deaths of children aged between one and four years. Morbidity is also often due to poor nutrition (CBS and UNICEF, 1984). As a result of these problems, one of the major health goals of the Indonesian Fourth Five-Year Plan (1984/1985 - 1988/1989) was to reduce infant mortality to about 70 per 1000 live births by 1989 (Republik Indonesia, 1985:27).

One of the Indonesian Government's approaches to the problem of high child mortality has been for the Ministry of Health to introduce the Family Nutrition Improvement Programme or *Usaha Perbaikan Gizi Keluarga - UPGK*. This programme started nationwide in 1978 and is considered a success in terms of the number of babies attending Well Baby Clinics, and the number of vitamin capsules, iron tablets and food supplements distributed. The activities of the programme aimed to improve the nutritional status of children aged under five years, and also that of pregnant mothers, to reduce low birth weights, and that of lactating mothers to help to reduce number of malnourished children.

Many factors influence children's nutritional status. The Family Planning Programme affects the demographic characteristics of families, which can affect nutritional status. In addition, the socio-economic background of the family or community is also thought to have an effect on children's nutritional status. The socio-economic background is a manifestation of the social and economic development programmes which form part of the Indonesian Government's Five-Year Development Plan (Republik Indonesia, 1985).

## 1.2 Objectives of the Study

The objective of this study is to evaluate the impact of the Family Nutrition Improvement Programme on children's nutritional status in two villages in Indonesia. The study is based on a survey of the knowledge of, attitudes towards, and practices (KAP) of a group of participants in the programme with regard to programme activities. This study also examines the relationship between the demographic characteristics and

socio-economic background of the participants, and the nutritional status of their children aged under five years.

The particular aims of this study are as follows :

- (1) to review the literature on demographic characteristics and socio-economic variables as these affect the nutritional status of infants and children in developing countries;
- (2) to describe the demographic characteristics and socio-economic background of the participants and the children;
- (3) to describe the Family Nutrition Improvement Programme and its implementation in the villages under study;
- (4) to investigate the relationship, if any, between the demographic characteristics and socio-economic background of the participants, and participant's knowledge, attitude and practice of the programme activities;
- (5) to examine the relationship between the demographic and socio-economic characteristics, and programme factors on the one hand, and the children's nutritional status on the other.

### 1.3 Nutritional Status: A Literature Review

Many factors are associated with the nutritional status of children under five, such as social biological factors (nutritional requirement), demographic and socio-economic factors. The following sections review the existing literature concerned with these various factors.

### 1.4 Nutritional Requirements

Generally, nutritional status is defined as the condition of the body resulting from the intake, absorption and utilization of food or nutrients over a period of time (Frankle and Owen, 1978; Popkin, 1978). Nutritional status of children reflects the physical growth and mental and emotional development of children as they grow (Ferholt, 1980; Nabaro, 1984).



Healthy growth and development of children, therefore, requires an adequate supply of all essential nutrients (carbohydrates, proteins, fats, minerals and vitamins). These must be absorbed, stored and utilized efficiently to allow the child to operate at full potential (Nabaro, 1984; Brown, 1984).

Energy needs of children per unit of body weight are generally high and proportionally much higher than for adults (Nabaro, 1984). Children aged one year need about 100 kilocalories (kcal) per kilogram of body weight. At age five they need 50 kcal per kilogram of body weight. Older children and adults need less than 50 kcal per kilogram of body weight (Martorell, 1980). This means that children need relatively more energy than adults to enable them to grow and develop physically and intellectually. A diet that is low in energy will be associated with reduced activity and slowed growth (Martorell and Ho, 1984). Thus, if children's consumption of certain essential nutrients is habitually low, body maintenance is impaired and stores of nutrients are decreased. The children may then be at risk of nutritional deficiency. Their weight will fall and they may become thin (Brown, 1984; Nabaro, 1984).

Growth failure and bodily disproportion characterize Protein-Calorie Malnutrition or PCM (Shakir, 1979). PCM is defined by the World Health Organization and Food and Agriculture Organization (1973) as a range of pathological conditions arising from a coincident lack of varying proportions of protein and calories, occurring most frequently in infants and young children, and commonly associated with infection.

### 1.5 Anthropometry

The nutritional status of children can be assessed by the use of anthropometry. These measures are based on the use of physical elements such as weight for age, height for age, arm circumference, skinfold thickness, head circumference and chest circumference (Martorell and Ho, 1984). Arm circumference and skinfold thickness indicate the thickness of fat in that part of the body.

Weight-for-age and height-for-age are more common measures of nutritional status of children. Arm circumference and skinfold thickness are less common measures, and head circumference and chest circumference are much less common measures (Jelliffe, 1966; WHO, 1983). Some

advantages in using anthropometric measurements are that they are highly reliable, take little time, and are cheap and easy to obtain (Martorell and Ho, 1984).

The indicators of weight for age, height for age, weight for height, arm circumference, skinfold thickness, head circumference and chest circumference give different interpretations of the nutritional status of children. Waterlow et al. (1977), for example, mentioned that weight for height is used to identify body wasting and height for age is used to identify stunted growth. Weight for age is commonly used to assess the degree of mild/moderate malnutrition (Ebrahim, 1983:107). Low weight for age can reflect chronic and severe malnutrition.

In practice, the nutritional status of children varies from country to country, community to community and obviously varies from family to family and even within the same family. Various factors may influence variations in the nutritional status of children.

## 1.6 Factors Affecting Nutritional Status

In this study, three factors are assumed to cause variation in the nutritional status of the children, namely demographic and socio-economic characteristics, and knowledge of, attitude toward, and practice or use of the Family Nutrition Improvement Programme. Each factor can be categorized by several variables which individually or collectively can affect children's nutritional status.

### 1.6.1 Demographic Characteristics

The demographic characteristics of the children and the mother consist of four variables: age and sex of child, number of siblings under the age of five years and total number of siblings. These variables and their effect on children's nutritional status are described below.

#### Age of Child

Passmore et al. (1974) stated that the increase in body weight of a healthy baby is about 4 - 5 kilograms in the first six months of life from an average birth weight of about 3 kilograms. This increase declines to about 2 - 3 kilograms in the second six months, and about 2

- 2.5 kilograms in the second year. The birth weight of a normal infant doubles in six months, triples in one year and quadruples in two years. Thus nutritional demands are highest relative to body weight in early childhood during the period of rapid growth (Valquist, 1977; Taylor et al. 1982). If weaning in this period is not accompanied by sufficient supplementary food, the child may become malnourished.

A number of empirical studies in Indonesia have documented how lack of supplementary food is related to malnutrition. For example, Kardjati et al. (1979:89) found that with advancing age, the nutritional status of children aged from 1 to 5 years in East Java deteriorated progressively, the shift being from "acceptable" nutritional status to stunted growth but without wasting. In his study in Bojonegoro, East Java, Brooks (1980) also found the same result. Fajan et al. (1983) observed a negative and significant relationship between age and nutritional status of children aged under five years measured by weight-for-age in a case study of seven villages in Indonesia.

Studies from other developing countries have produced similar results. For example, in a study of child malnutrition in Southern Brazil, Victoria et al. (1986) found that children aged 12 to less than 36 months are more likely to be stunted, wasted or under weight. In an urban Gambian community, Tomkins et al. (1986) discovered that the age of children, especially from 6 to 35 months was negatively associated with nutritional status, as measured by height for age.

#### Sex of Child

Under normal conditions, male children usually grow faster than female children. Tanner (1978:5) mentioned that generally, from the biological point of view, girls are typically lighter in weight and slightly shorter than boys at ages under five years. Chen (1979) stated that many cultures show a preference for male children and a tendency to neglect female children with the consequence that their growth may be impaired. This adds to the difference in weight and height of boys and girls.

Studies in Indonesia such as that of Kardjati et al. (1979:68) have found that, on average, male children are heavier and longer than female children. The same conclusion was also reached by Soekirman (1983:170) in a study of the nutritional status of infants from low-income households in Central Java.

Other studies which have documented a similar pattern include Bairagi's (1980) study of the Companiganj Health Project, Noakhali, Bangladesh; Bhuiya et al. (1986) in Bangladesh; Kimmance's (1972) study of Jordanian children aged from six to sixty months, and Ballweg's (1972) study of Haitian children. All found that among the same age group, female children are more likely to be malnourished than male children.

#### Number of Siblings Aged Under Five Years

Normally the growth of children aged under five years is better for those without an older sibling than for those with an older sibling. This situation is perhaps associated with competition for food and time allocation for caring for the children.

Cassidy (1980) stated that competition for food is related to the age of the children. The newly-weaned toddler more commonly competes on a more or less equal basis with older siblings for the available food supply. Mothers of toddlers often do not check whether they receive a proportionate share. Mothers usually assume that what a child gets is what she (he) wants and needs.

Kardjati et al. (1979:71) found that in East Java mothers with only one child aged under five years had a lower proportion of malnourished children than those with two or more children in that age group. Other studies, for example that of Wolff (1965) in Malaysia, found that toddlers begin to eat the same food as their older siblings when they start walking and within a few months they commonly compete for food equally with siblings. He indicated that the thin toddlers are those who refuse to eat the older sibling's food. This attitude and practice leads the toddlers to have a high risk of malnutrition.

The wider birth interval is often considered to have the same effect as the less number of siblings under five. Wray and Aguirre (1969) discovered that among Colombian children, the rate of malnutrition was high when the birth interval was less than three years but there was a marked decline when the interval was more than three years. Marchione et al. (1980) also observed that child growth tended to fail as the number of preschool siblings increased.

#### Total Number of Siblings

A negative relationship is normally found between the total number

of siblings and the nutritional status of children aged under five years. This may be due to competition for food and lack of individual attention from the mother. It is more common among low income families.

Robson (1972) found that families with four or more children were more associated with impaired growth of children than families with less than four children. Marchione et al. (1980) also emphasized that the growth of children tended to fail as family size increased.

Some studies used various other growth indicators and found that children from large families had significantly lower nutritional status (Wolfe and Behrman, 1982; Gupta and Srivasta, 1977; MacCorquodale and de Nova, 1977; Mukherjee and Sethna, 1972; Christiansen, Mora and Herrera, 1975).

#### 1.6.2 Socio-Economic Factors

According to Mosley and Chen (1984), the socio-economic determinants (independent variables) for nutritional status improvement can be grouped into three broad categories : (1) individual-level variables such as individual productivity of mother and father in family (occupational status), traditions, norms, attitudes (2) household-level variables such as income and/or wealth (3) community-level variables, such as the ecological setting, political economy, and the health systems. In this study individual-level and household-level variables are mostly considered, because they are included in the primary data, and because there probably is little variation between the two villages in the community-level variables. The individual-level variables considered are mother's education, mother's occupational status, father's education. The household-level variables considered are family income, family wealth and size of house. The community variables are number of nutrition cadres, number of weighing posts, and rural leadership.

##### Mother's Education

Mosley and Chen (1984) stated that mother's educational level (formal education level such as primary, secondary or higher education) can affect child survival. There are five ways that mother's education might affect child's health : (1) education may improve the mother's knowledge of sickness prevention; (2) education may be associated with

the mother's awareness of health services; (3) education may influence the mother's choice and increase her skill in health care practices related to nutrition, hygiene, preventive care and disease treatment; (4) mother's education may change the traditional balance of family relationships, and ensure that a greater share of available resources is devoted to the children (Schultz, 1984; Caldwell, 1979).

In an experimental study of Indonesian pre-school children Karjadi et al. (1971) found that low parental education was a determinant of malnutrition of their children. However, in another study in East Java, Kardjati et al. (1979:70) found that mother's education had no significant relationship to the nutritional status of children aged under five years. Brooks (1980) and Fajan et al. (1983) also found that there was no clear relationship between level of maternal education and nutritional status of children under five in their studies.

A number of studies in developing countries have shown that mother's education has a significant effect on the improvement of nutritional status of their children, for example Wolfe and Behrman (1982) in India; Bairagi (1980) in Bangladesh; Battad (1977) in The Philippines; Graham (1972) in Peru and Pachauri and Marwah (1970) in Nicaragua. However, this was not found to be the case in population studies in Columbia and Nepal (Wray and Aguirre, 1969; Martorell et al. 1984).

#### Mother's Occupational Status

The mother usually holds a key role in caring for the children. The mother's skill and time spent in caring for the children usually determine how she carries out her role in relation to the health of her children. Birdsall and Greevey (1978) and Engle (1981) stated that in transitional societies the allocation of child care time often competes with the time needed for income generating work. Working mothers are mostly educated mothers. As with the mother's role in child-care, there are two possibilities : first, educated mothers who work away from home can instruct child care persons : maid, father, grandmother/father, older siblings, mother's relative; second, educated mothers who work can increase their income, so that they can purchase better food and medicine to compensate for their lack of time for children.

Regarding the effect of mothers' working on the children's

nutritional status, Soekirman (1983:178) found that mothers who worked more than seven hours a day approximately one kilometer away from home had smaller and lighter infants compared to the non-working mothers.

#### Father's Education

Father's education has a clear association with the nutritional status or growth of children. Chen (1979) for example, stated that illiteracy of parents is correlated with low weight gain of children. Mosley and Chen (1984) mentioned that father's education strongly determines the household's assets and the marketable commodities that the household consumes. The education level of the father may also influence attitudes and preferences in choice of consumption goods, including child care services. This effect is likely to be most significant for child survival when educated fathers are married to less educated mothers.

Some studies that have been undertaken in Indonesia, for example Soekirman (1983), found that a high level of father's education showed a positive and significant effect on infant's nutritional status as measured by weight for age. Brooks (1980), however, found that there was no apparent relationship between parents' education and the weight for height gain of children. Karjadi et al. (1971) found that children aged under five years with poorly educated or illiterate parents were observed to be more malnourished than the children of well-educated parents.

In Malaysia, a study carried out by Wan Muda (1984), found that the nutritional status of children was positively and significantly correlated with both literacy and the educational level of their parents. However, a study of pre-school children from 82 selected rural families in South India showed that parents' education did not have much influence on the improvement of child feeding practices which may lead the children to be malnourished (Whyte, 1974).

#### Family Income

According to Chen (1979), and Mosley and Chen (1984:37), the effect of income on the health of family members is mainly related to the family's ability to purchase consumption goods. This is reflected in the purchase of minimum quantities of basic food of sufficient variety and with adequate amounts of all nutrients. Income is also related to the

ability to purchase health care, including services and commodities such as physicians, hospitalization and drugs, maternity care during childbirth and child care. The influence of poverty on the ability to purchase sufficient food supplies and to sustain the growth of young children is dependent on the cash of the family. Gurney (1979) observed that poverty is the main determinant of Protein-Calorie Malnutrition (PCM) in a community, especially for young children.

In India and Bangladesh, Whyte (1974) found a direct correlation between level of cash income and the consumption of food. The rural people of India were at poverty level and able to purchase only minimum calorie requirements. This means that level of consumption of protein was very low, which caused children to become malnourished. A study of Malay children (McKay, 1969) and a study of Colombian children (Wray and Aguirre, 1969) discovered that the nutritional status of children was lower in low cash income families than in high cash income families. Studies in Indonesia showed that family income also significantly affected children's nutritional status as measured by length of infant (Soekirman, 1983). This was also observed by Brooks (1980), and Alisyahbana (1984). However, some studies did not indicate any significant effect of family cash income on the growth of children (Kardjati et al. 1979; Sayogyo et al. 1973; Fajan et al. 1983). Studies from other developing countries, however, showed that cash income was significantly and positively associated with the nutritional status of children (Wan Muda, 1984 in Malaysia; Bairagi, 1980, in Bangladesh; Becker et al. 1986, also in Bangladesh).

#### Family Wealth

While Income reflects the flow and accessibility of resources, wealth is more a reflection of the family's prestige and social status. If we assumed that a healthy life is considered to be one of the aspirations of family life, then wealth of the family might be associated with the family's health, especially the health of the children.

A study carried out by Soekirman (1983) indicated that the wealth of the family did not show any significant association with children's nutritional status. This may be because the sample in that study was composed of low income families. However, Bhuiya et al. (1986) found in



a study in Bangladesh that household wealth showed a definite and positive relationship with children's nutritional status.

#### Size of House

Like family wealth, the size of the house seems to reflect more the prestige and social status of the owner. The size of the house may affect hygiene, and the availability of ventilation and sufficient space to sleep household members (Mosley and Chen, 1984). Size of house is one of the supporting factors influencing the health condition of family members.

Tomkins et al. (1986) studied socio-economic factors associated with child growth in urban Gambia. They found that children living in European style houses had better nutritional status as measured by height for age than children of the same age living in traditional style housing, and this difference was highly significant. In a study of the relationship between socio-economic status, morbidity, food intake and growth in young children in two villages in Bangladesh, Becker et al. (1986) found that for boys anthropometric measures (weight and height for age) were related positively with the size of the house.

#### 1.6.3 Nutritional Knowledge, Attitude and Practice Factors

The variables knowledge of, attitudes towards, and practice (KAP) of activities in the Family Nutrition Improvement Programme (FNIP) imply the degree of participation of the mother in the activities of the programme. This programme employs an educational strategy designed to provide mothers with the knowledge and awareness necessary for them to monitor and improve the nutritional status of their family members.

Knowledge, awareness and adoption of the messages of the programme lead to a greater investment in health and survival rate (Schultz, 1984). Programme participation is related to the exogenous variables of price, income, education and age. Health and related behaviour are the result of one or more of a range of demand variables : (1) The programme may reduce the price of the health input, directly through subsidization of the goods or services, or indirectly by increasing access to the clientele groups, thereby reducing the time or travel costs to evaluate or use the service; (2) The programme may provide information on how to produce health more efficiently. This might include new information on

how to prepare food with sufficient nutrients and how to evaluate the growth of children, in order to yield a greater survival rate for a given expenditure. Higher participation in the programme's activities, therefore, is likely to improve the nutritional status of children.

In practice, there are many activities of the programme, but in this particular study, the four variables related to KAP are considered as determinants of nutritional status of children aged under five years. These variables are length of time of the programme, frequency of receiving nutritional education, frequency of weighing children and frequency of receiving food supplements.

From an experimental study of rural West Java and Central Java, Sayogyo (1978) found that previously malnourished children had improved nutritional status after regularly receiving food supplements for a certain period of time. Their mothers had adopted new habits of food selection and distribution for the family members, especially for children aged under five years. This was due to the effect of nutritional education.

A case study of the Indonesian Family Nutrition Improvement Programme in seven villages in Indonesia (Fajan et al. 1983) showed that the programme successfully mobilized community participation in activities but had no clear effect on the nutritional status of children aged under five years. They also showed that the mean nutritional status of children was unrelated to the duration of the mothers' participation in the programme. In addition, although the frequency of receiving nutritional education, the frequency of weighing children and the frequency of receiving food were high, these factors did not show a clear effect on the nutritional status of children. However, a significant and positive relationship between the frequency of weighing a child and the child's nutritional status has been observed in East Java and Bali (Indonesian National Family Planning Coordinating Board et al. 1986).

In the Narangwal experiment in India children in experimental villages were given nutritional supplements. Children aged above 17 months in the experimental villages had better nutritional status than those children in the control villages who did not receive food supplements. The children aged 36 months in the experimental villages

had an average weight of 560 grams more and were 1.3 centimeters taller than the children in the control villages (Taylor et al. 1982).

The INCAP (Institute of Nutrition of Central America and Panama) supplementation experiment, conducted during 1969 - 1977 in four villages of Guatemala, found that children in two villages who received protein-calorie supplements had better weight for age and height for age than children in two other villages who received low-calorie supplements (Lecthtig et al. 1979).

## CHAPTER 2

### THE FAMILY NUTRITION IMPROVEMENT PROGRAMME, AREA OF STUDY, METHODOLOGY, AND CHARACTERISTICS OF RESPONDENTS

#### 2.1 The Family Nutrition Improvement Programme

Efforts to solve the problem of malnutrition of children, especially in the first year of life and up to the age of five years, were made by the Government of Indonesia many years ago. In 1963, the government developed a nutrition improvement programme. In 1974, the government improved the organization and implementation of this programme, based on Presidential Instruction No. 14 of that year. The improvements took the form of a more integrated operation which involved several ministries. Further, improvements were made in 1979 to the programme organization under the Presidential Instruction No. 20/1979, which clarified the ministries involved in the programme's operation. Since 1979, the programme has been carried out with the collaboration of many ministries (Tarwotjo et al. 1983), including Health, Agriculture, Religion, Social Affairs, Education and Culture, Domestic Affairs, Information, and Women's Affairs, together with the National Family Planning Coordinating Board. Because of the involvement of such a large number of ministries it is known as a multisectoral programme.

At the village level, the activities of the programme are undertaken by nutrition cadres (volunteer women who organize the operation of the nutritional programme activities), in conjunction with the wives of the village and hamlet headmen. The health centre staff at the sub-district level provide supervision for the programme's implementation in the village level.

### 2.1.1 Objective of the Programme

The main objective of the programme is to improve the health and nutritional status of children under the age of five years as well as of pregnant and lactating women (Fajan et al. 1983). The programme also aims to aid the reduction of infant and child mortality rates (Tarwotjo et al. 1983).

The programme involves a number of activities (Azwar, 1983). These include the monthly weighing of the children as a means of early detection of children at risk. The programme also provides nutrition education concerning adequate diets for pregnant and lactating women, as well as for children in the various stages of development. In addition to nutrition education, the programme includes education for mothers concerning family planning, the importance of immunization for child health, the use of oral rehydration solutions for treatment of childhood diarrhoea, and the use of household areas for cultivation of home gardens and raising of poultry, small livestock and fish (where water resources are available).

Nutritional first aid consists of the provision of iron folate tablets for women in the third trimester of pregnancy and high dosage vitamin A capsules for children over one year old. Pre packaged oral rehydration salts (Oralyte) for children suffering from diarrhoea are distributed as appropriate to mothers and children. The programme also provides rehabilitative food supplements for severely malnourished children. Funds for supplementary education on feeding are provided by the Ministry of Health and the National Family Planning Coordinating Board.

### 2.1.2 Implementation of the Programme

The first stage of programme implementation in each village was the identification of malnourished children joined with the programme. Selection of children under five for the nutrition programme at the hamlet and/or village level was by the nutrition cadres and the wives of hamlet and village headmen under the supervision of the Health Centre staff: doctors and mid-wives. The following stages of selection were carried out: (1) all children under five in the village were weighed; (2) the children's growth was assessed by looking at their

weight-for-age; (3) by comparing the observed weight-for-age and the WHO standard, the children's nutritional status was determined; (4) the children who were malnourished or nearly malnourished were selected for the programme.

The programme focuses on village and hamlet level activities. At the village and hamlet level, the activities of the programme take place at the hamlet weighing post. The post is equipped with a scale, growth charts, nutrition education aids, reporting and recording forms, facilities for the preparation of foods for group demonstrations and educational feeding activities. All activities are conducted by village volunteer nutrition cadres who are assisted and supervised by Health Centre staff, particularly doctors, mid-wives and nurses.

### 2.1.3 Village Nutrition Cadres

As previously mentioned, the village nutrition cadre is a volunteer who organizes the programme activities. The cadre is a woman who resides in the hamlet or village. Selection and recruitment of the cadres is done by village or hamlet headmen and/or their wives. Cadres are selected depending on their characteristics such as education (they should have at least primary education), availability (having sufficient time), social acceptability and responsibility.

Before beginning active work the cadres receive training for three days. This short course is provided at the sub-district level by a range of government bodies. It might be conducted by a member of the local health centre staff (doctor, mid-wife, nurse), the Family Planning Coordinator, the Information Officer. The subjects taught in the course are as follows ;

- (1) Implementation procedures for all aspects of the programme  
(nutrition, family planning, immunization, mother and child health and weighing post services)
- (2) Practical work, particularly observation of a number of randomly selected families in a village as a clientele group
- (3) Knowledge about the principles of child care, such as breastfeeding, weaning, feeding practices and child weighing.

In the programme's implementation process, the cadres normally work together with the wives of the village or hamlet headmen in organizing the programme activities. The activities of the programme which are normally performed by the cadres and the wife of the hamlet headman are: (1) supervising the operation of the programme in the village or hamlet; (2) providing education on the importance of improvements in feeding practices and food supplements; (3) education on nutrition within and beyond the weighing post; (4) home visits; (5) monitoring the programme using a standard form. The cadres and the wife of the hamlet headman usually execute the programme at the weighing post where the mothers and children are gathered. The post is equipped with appropriate weighing and measuring instruments.

Once a month the programme's activities are conducted according to the "four table services" system. Child weighing and pregnant mother registration occurs at the first table. At the second table, the child is weighed, at the third, the weight gain is recorded, and at the fourth table, the mother is advised to feed the child with better food, and given medicine, vitamin A, and/or iron folate tablets, if the child's weight has not increased or has decreased. However, when the child's weight increases regularly, the mother is advised to keep to her previous feeding habits (Tarwotjo et al. 1982). Afterwards, the children receive the food supplements such as green bean-coconut milk porridge, chicken soup and rice, egg and vegetable and rice. One or more cadres are responsible for each table, and the mid-wife especially is responsible for the fourth table.

## 2.2 Area of Study

The two villages, Blulukan and Singopuran, in which this study was carried out, are located near to the western outskirts of the Municipality of Surakarta (the largest city in the southeastern part of Central Java Province). Blulukan is about 10 kms. and Singopuran 15 kms. away from the centre of Surakarta, and both are closer to the city than to their respective district centre (capital city of district which is surrounded by villages and it is an administrative unit below provincial level). Blulukan is situated on the road connecting the domestic airport with Surakarta. Singopuran is situated on two roads, an

Figure 2-1: Map of Indonesia

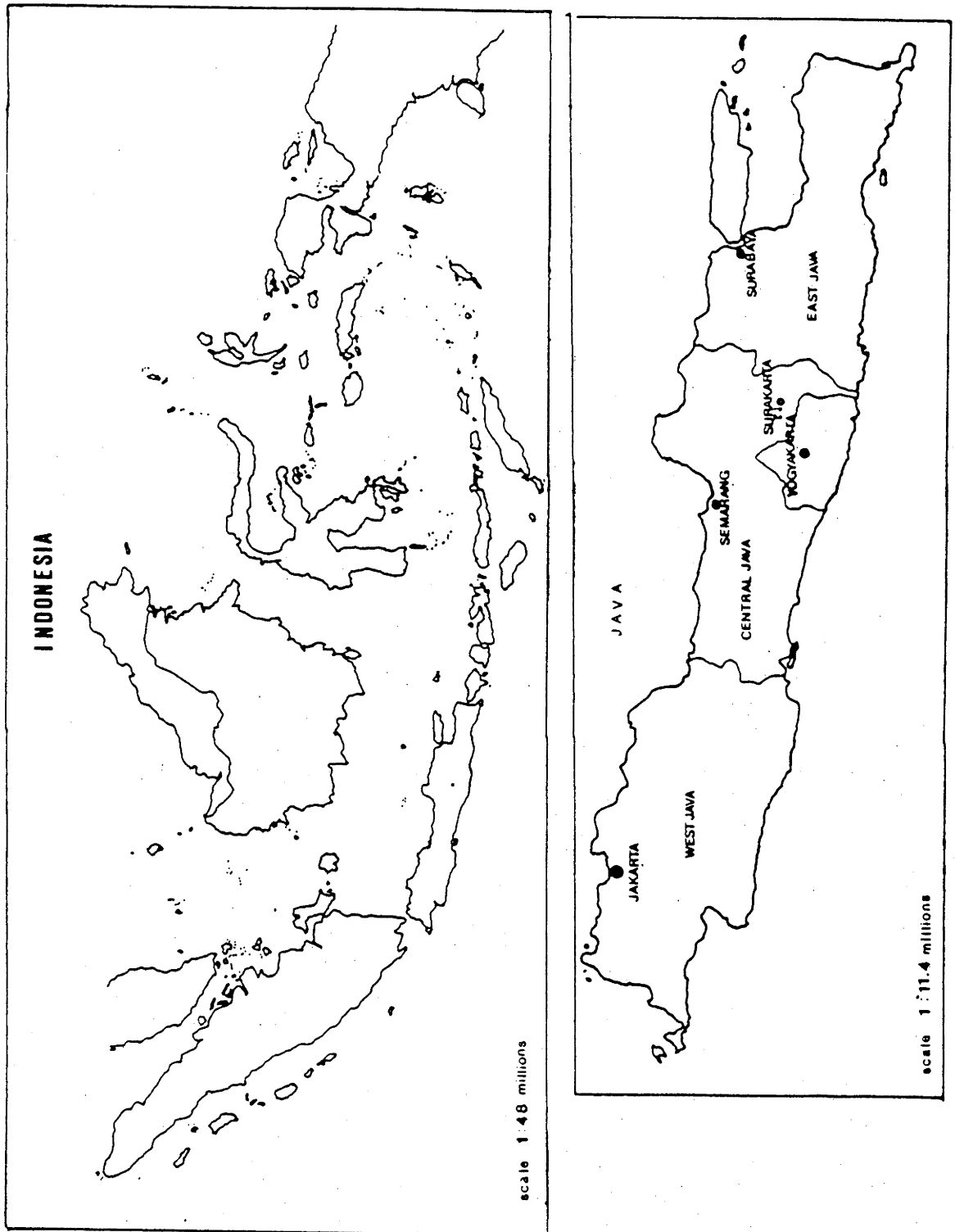




Figure 2-2: Map of Central Java

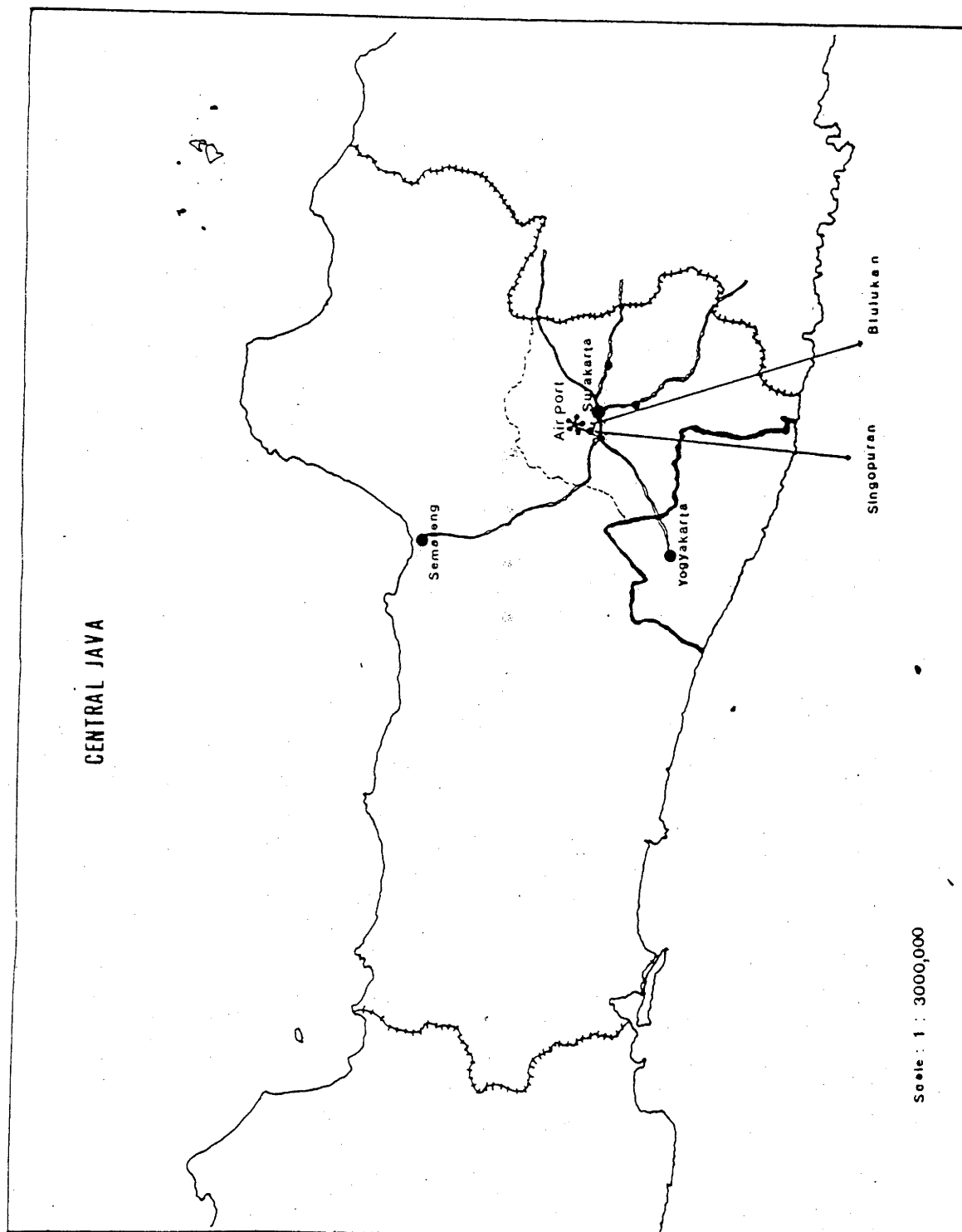
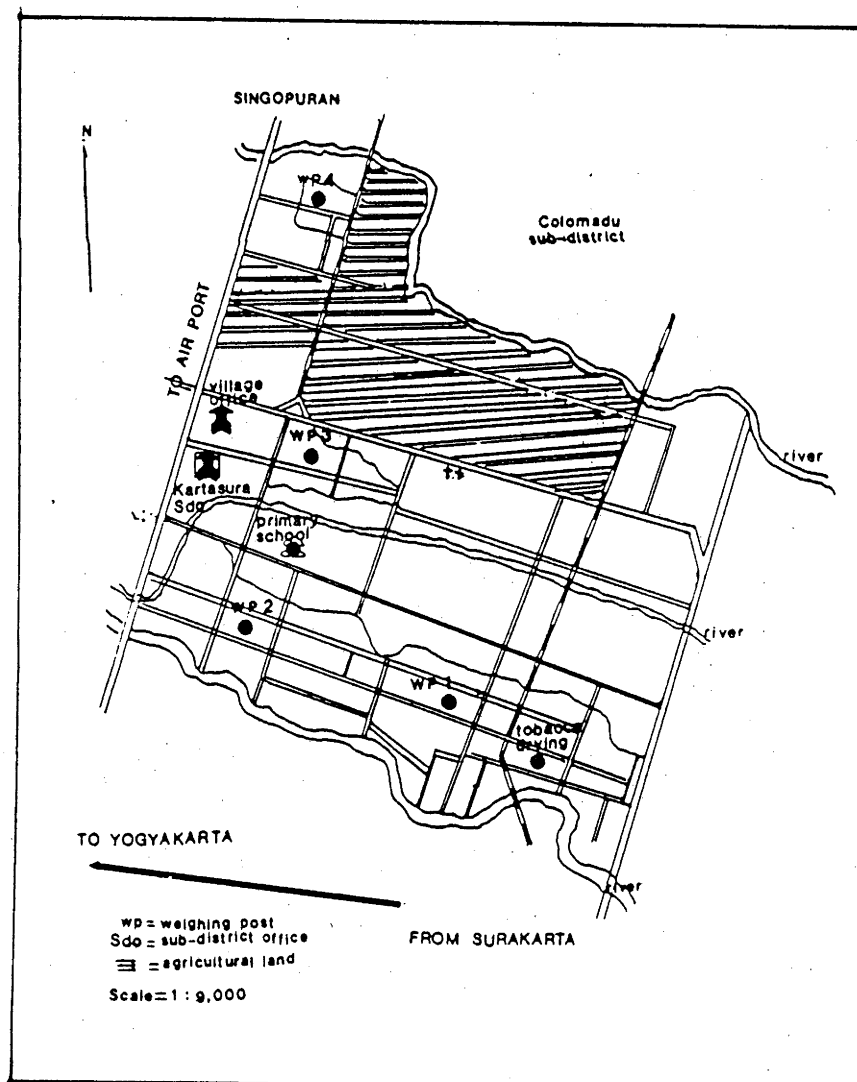
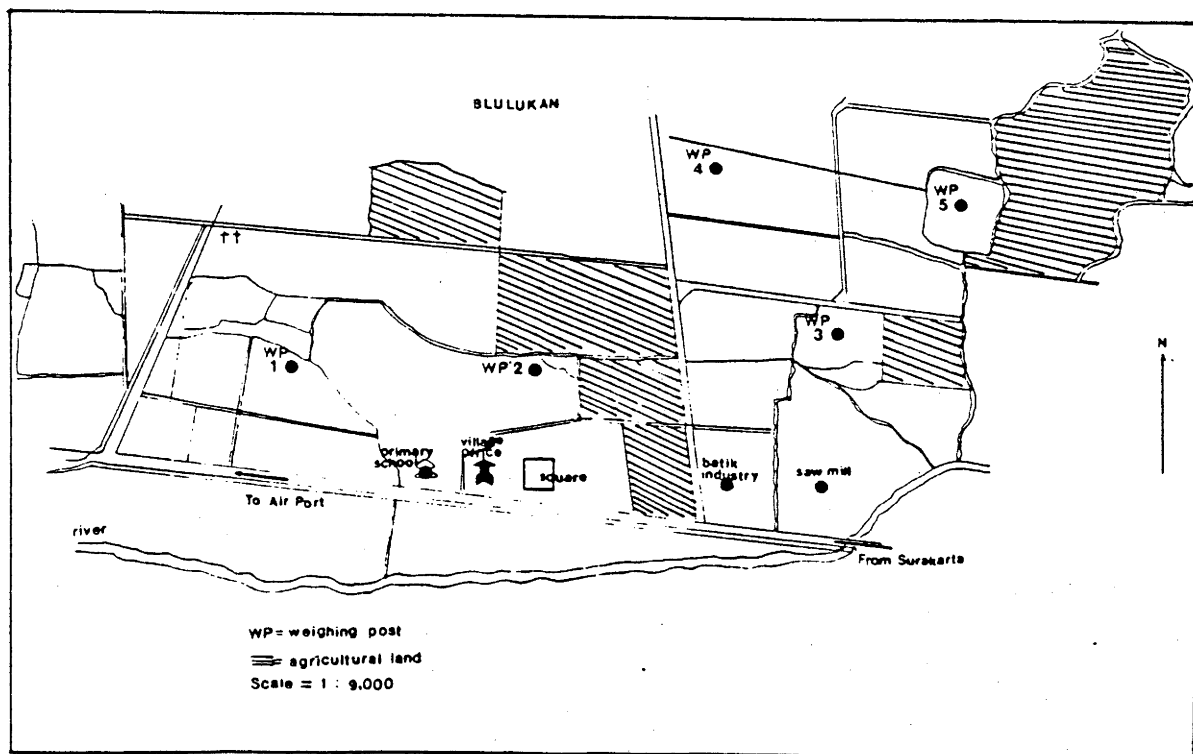


Figure 2-3: Map of Bluluk and Singopuran



intercity road connecting Surakarta to other cities like Semarang and Yogyakarta, and another road connecting the domestic airport with Surakarta.

In Indonesia, the village or *desa* includes the surrounding agricultural land, and commonly has roads, a village cemetery, an area of public buildings for social gatherings and sometimes has village squares and river. Blulukan is 164 hectares in area, while Singopuran is 133 hectares. The total irrigated land holding in Blulukan is 108 hectares and 80 hectares in Singopuran. Normally this land is used for planting rice and sugar cane. However, every year different parts of the agricultural land are rented by the *Colomadu* Sugar Cane Factory. The rest of the land consists of home gardens, roads, rivers, villages squares and cemeteries.

### 2.2.1 Identification of the Villages Studied

Whole villages in the districts and sub-districts involved in this study have implemented the Family Nutrition Improvement Programme. Programme factors in each village have contributed to varying states of the programme's operation. The two villages in this study, Blulukan and Singopuran, have an unusual way of organizing the programme activities. They are exceptional in a number of ways: first, at the beginning of the study neither village had a village headman. The headmen of the two villages had been asked to retire. This was due to the mismanagement of certain development programmes in their villages. However, the nutrition programme was well under way. Second, Blulukan village was preparing to participate in the nutrition programme competition at the residency level (the level of government administration just below the provincial level). The village had previously won this competition at the district level. Third, during the study, the election of a new village headman was carried out in Blulukan, but this had not yet happened in Singopuran. Fourth, the nutrition programme was running well, because of good cooperation in the programme's activities between the cadres and the mothers.

This cooperation between cadres and mothers is reflected in an activity called *arisan*. This is a popular form of community lottery in Java in which all participants eventually win a prize. In the *arisan*,

about ten per cent of the prize (total money) is contributed to the nutrition programme. This money is used to support the preparation of food supplements which are given to the children at the weighing post. Hence, psychologically, the mothers who feed the children with the food supplements from the programme feel comfortable, because they recognize the food supplements as theirs. Although Blulukan and Singopuran have the same activities, Blulukan has better way of organizing the nutrition programme activities than Singopuran.

## 2.3 Methodology

This study primarily used the survey method to collect the data. Information sought included demographic and socio-economic characteristics and knowledge, attitude and practices of the respondents, and the nutritional status of children in the family under the age of five years. The respondents were mothers who had children aged under five years, and who had growth monitoring cards for the children. This card was a requirement for participation in the programme. The growth monitoring cards also recorded the weight of children every month, so that the nutritional status by weight-for-age of children was available. A child aged 12 months with 8 kilograms body weight, has a normal nutritional status by weight-for-age, and whose less than 8 kilograms body weight, has below normal nutritional status according to the WHO standard. Both interview and observation approaches were used in the data collection. Interviewers used a structured questionnaire for the eligible respondent, and another structured questionnaire for the programme implementers. The study was carried out at the beginning of the dry season over December 1985 and January 1986.

### 2.3.1 Sampling Procedures

This study used a random sample from the group of eligible respondents (currently married mothers who had children under five years and who possessed growth monitoring cards). In Blulukan, 150 mothers were eligible respondents. Between them, they had 215 children under the age of five years. About 73 mothers whose children under the age of five



Umur 3-4 tahun      Umur 4-5 tahun

20  
19  
18  
17  
16  
15  
14  
13  
12  
11  
10  
9  
8

3.0 3.2 3.4 3.6 3.8 4.0 4.2 4.4 4.6 4.8 5.0 5.2 5.4 5.6 5.8 6.0

ALASAN UNTUK PERHATIAN KHUSUS

[FAKSIASI]

SUNTIKAN BCG

- Mambuat pertandingan terhadap Penyakit Para-Para
- Meniadakan situasi mungkin
- Dapat dibuktikan secara statistik lahat

Tanggal Penyuntikan	
Tanggal Pemeriksaan Hasil	Hasil
Tanggal Penyuntikan Ulangan	

<p align="center"><b>PENCACARAN</b></p> <ul style="list-style-type: none"> <li>- Memberi perlindungan terhadap Penyakit Cacar</li> <li>- Mencegahnya sesempurna mungkin</li> <li>- Sebaiknya diberikan sebelum umur 3 bulan</li> </ul>	
<p>Tanggal Pencacaran</p>	
<p>Tanggal Pemberian Masid</p>	<p>Masid:</p>
<p>Tanggal Pemberian II Masid</p>	

### SUNTIKAN OPT

- Memberi perlindungan terhadap Penyakit-Penyakit Berbahaya Rajin, Terhadap dan Difteri
- Mencegahkan tpa baik berumur-turut, yaitu yang ber-1 pada umur 3 bulan, ber-2 pada umur 4 bulan, dan ber-3 pada umur 5 bulan
- Jika esakadiah lagi suntikan ulangan atau saku setelah ber-3
- Kalau pertumbuhannya terganggu harusnya diperiksa

	Tgl. direspon datang	Tgl. penyuntikan
Suntikan I		
Suntikan II		
Suntikan III		
Suntikan IV		

**OBAT PENCEGAH POLIO**

- Beribumuhi pd suatu cairan untuk diminum
- Mencegah pertolongan terhadap Penyakit Lumpuh Kanan-Kiri
- Menetaskan 1 tga kali berturut-turut, yaitu yang ke-1 pada umur 3 bulan, ke-2 pada umur 4 bulan, dan ke-3 pada umur 5 bulan
- Kalau terlambat menyuntiklah ke pada petugas kesehatan

	Tgl. diberikan daging	Tgl. pemberian obat
Pemberian I		
Pemberian II		
Pemberian III		

1. Sedapat-dapatnya, saudara anak Ibu sempat umur-2 tahun.  
Ingatlah: Air Susu Ibu adalah makanan bayi yang paling sempurna.
2. Selain Air Susu Ibu, berikanlah makanan lain-lain sebagai berikut:
  - mulai umur 3 bulan: buah-buahan dan bubur yang dihaluskan;
  - mulai umur 6 bulan: tambahkan juga nasi halus dicampur sayur-sayuran berwarna hijau dan nasi laut-pada-laut yang dihaluskan.
3. Jika Ibu ingin putrinya anak lagi, hentikanlah pemberian susu until reached berumur 3 tahun 3 (tiga) bulan.
4. Munkamlakan Suntikan Pencegahan Penyakit (vaksinasi) sesuai dengan petunjuk-petunjuk yang terdapat pada kartu ini.
5. Berilah selalu makanan yang sehat pada anak Ibu, karena makanan itu ialah yang merupakan jaminan yang terpenting bagi kesehatan / juga bagi anak Ibu sendiri, supaya anak lebih cepat sembuh kalau ia tetap mendapat makanan yang bergizi.

JENIS SAYUR-SAYURAN, LAUK PAUK  
DAN BUAH-BUAHAN SEMAT



Name Area



PESAN UNTUK IBU

Kartu Anak Sehat ini disediakan khusus agar supaya ibu sendiri dapat langsung ikut menjaga kesehatan dan pertumbuhan anak ibu.

Untuk mengetahui keadaan kesehatan diri kita, salah satu cara yang paling mudah dan paling mantap ialah dengan mengukur perkembangan berat badannya.

Oleh karena itu, tumbangkandah anak II  
setiap bulan di Pos Penimbangan setempat.  
Bersama kartu ini setiap hari Ibu menimbang

hari anak itu, dan juga setiap kali itu membuat  
anak itu ke Puskesmas/BKIA dan kegiatan-kegiatan  
kegiatan setempat (permainan, penyuluhan d  
lain-lain).

Nama Anak		
Laki-Laki	Anak yang ke	Tanggal Lahir
Perempuan		
Berat Badan Waktu Lahir		gram
Nama Ayah		
Pekerjaan		
Nama Ibu		
Pekerjaan		
Alamat		

DAFTAR ANAK DALAM KELUARGA INI

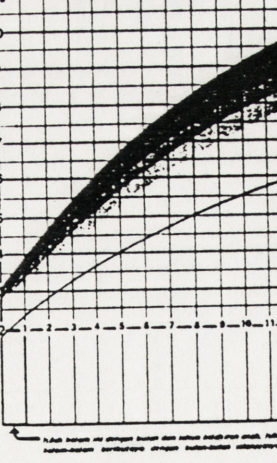
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1) berat-badannya tidak naik-naik pada dua kali

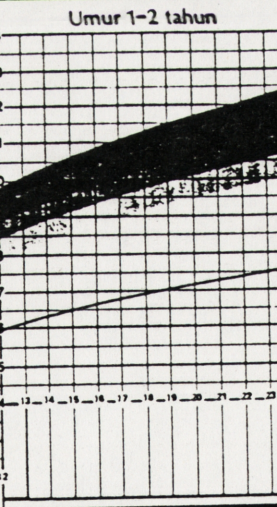


**INGATLAH:**  
**AIR SUSU IBU**  
ialah makanan bayi  
yang paling sempurna

Umur 0-1 tahun

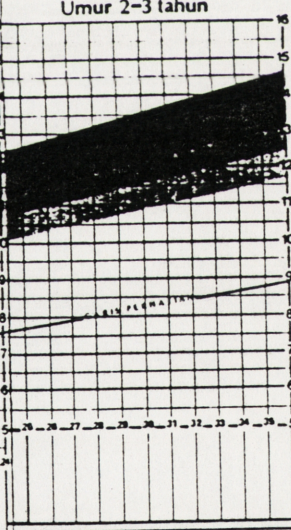


2) berat-badannya berada di bawah Garis Perhatian.  
Pelajar tersebut selangkah dapat memberikan  
nushah dan perincian yang diperlukan.



### PENYAKIT DIARE (MENCRET)

Larutan Gula-Garam dapat dibuat sendiri di rumah, dengan takaran berikut: Dalam 1 liter



3 gelas air yang sudah dimatikan, campurkanlah 8 sendok-teh Gula dan satu sendok-teh Garam. Anak yang mencoret perlu segera diberi minum Larutan Gula-Garam sebanyak 1 msa (maksimumnya sampai 2 atau 3 gelas). Setelah itu, berikan lagi 1 minimum 1 gelas larutan setiap kali ia mencoret. Selama ia masih mencoret, selama itu pula ia perlu diberi minum Larutan Gula-Garam.

Sementara itu, bawalah segera anak tersebut ke Puskesmas atau petugas kesehatan yang terdekat.



years and these children did not have growth monitoring cards. In Singopuran, 148 eligible mothers had 210 children aged under five years. All of these children had growth monitoring cards. About 61 mothers whose children aged under five years and they did not have growth monitoring cards. Half the eligible respondents in each village were selected at random for this study, a total of 149 respondents with 191 children consisting of 149 youngest children and 42 older siblings under five. The reasons use the sample of the two villages is mentioned in section 2.2.1.

During the data collection, two respondents were dropped. One of them refused to be interviewed and the other provided incomplete information. Therefore, the final sample size for this study was 147 respondents who had 147 youngest children and 42 older siblings under five. Only the youngest children are included in the analysis.

#### 2.3.2 D a t a

The primary data for this study were collected by interviewing the 147 mothers in the sample. The interview was conducted by two field assistants (a student and a junior lecturer staff member at Sebelas Maret University, Surakarta), using the questionnaire (see Appendix 3).

Secondary data are used to support the interpretation of the primary data. They consist of all information concerned with the implementation of the Family Nutrition Improvement Programme which was not gained from the respondents. Secondary data were obtained at the district or *kabupaten*, sub-district or *kecamatan*, village or *desa* and hamlet or *dukuh* level. Collection was done by the team responsible for the implementation of the programme at each administrative level. Secondary data on the social and economic background of the villages was obtained from the administrative unit office.

#### 2.3.3 Analysis

Three methods of analysis were applied to the data. First was cross tabulation, to describe the association between demographic characteristics and socio-economic background and the KAP related variables, and the nutritional status of the youngest children under the age of five years. This was accompanied by the use of the chi-square

test of significance. Second was zero order correlation, to find the correlation between a pairs of socio-economic variables. Third, Multiple Classification Analysis (MCA) was used to display the results of analysis of variance of the dependent variable (the youngest children's nutritional status), and represent the proportion of variation of the dependent variable which is explained by the additive effects of all independent variables and covariates (Nie et al. 1975:409).

The variables related to demographic and socio-economic characteristics and knowledge, attitudes and practices of the programme are considered to be independent variables. The nutritional status of the youngest child is considered to be the dependent variable.

For this analysis, the reference tables used are those recommended by the World Health Organization (1983). These tables were compiled in the United State of America by the National Center for Health Statistics (NCHS) based on children aged from 0-36 months and a second group aged 2-18 years, each year age group contained 300-1600 cases. These tables of weight-for-age, height-for-age, and weight-for-height are presented in two forms: the first as percentiles and the second as the median value with one, two and three standard deviations above and below the median.

To do the analysis and convert the data from the interval form to the continuous form, the measure "Standard Deviation Score" or SD score will be calculated using the formula:

$$\text{SD Score} = \frac{\text{individual's value} - \text{median value of reference population}}{\text{SD value of reference population}}$$

The nutritional status of the children is then determined according to the SD score of Weight-for-age (W/A) by the use of cut-off points of 1.50 as recommended by WHO (1983:25). The children with score below -1.50 are classified as below normal or malnourished. Those between -1.50 and +1.50 are considered to be normal, while the children above +1.50 are classified as above normal or over-nourished by W/A of the reference population.

Family wealth comprises the household's goods and possessions: bicycle, livestock (cows, buffalos, pigs, goats, poultry) and luxury goods such as motorcycles, televisions, radios/cassette players, sewing machines, watch/clocks. Wealth was indexed in rupiah as a cumulated value of all items on the basis of current price.

## 2.4 Limitations of the Data

This study does have some data limitations which affect the analysis. The purpose of study is to describe and investigate the current level of the children's nutritional status and its relation to the demographic characteristics and socio-economic backgrounds of the respondents and the KAP related variables of the programme.

This study was designed to collect in-depth information from a relatively small number of respondents. Therefore it is limited as the findings cannot be generalized to have implications for the nutritional status of all children aged under five years in Central Java or Indonesia in general.

The sample of 147 mothers is smaller than the minimum recommended sample size for a cross-sectional study of nutritional status. The minimum recommended sample size is at least 200 respondents (Waterlow et al. 1977). The sample also did not include mothers whose children did not have growth monitoring cards. This means that the sample may be biased, because the sample study was selected from mothers whose children under five who were in the programme. The sample size of this study was also determined by the constraints of time.

The measures of nutritional status used in the study did not include all the possible anthropometric variables for children's nutritional status, such as height-for-age and weight-for-height. This study uses weight-for-age as an indicator of nutritional status. While data on height were collected, the data were not reliable because the tape used to measure the children's height did not conform to the WHO recommended standard (WHO, 1983). This study used a multi-purpose tape, while the WHO tape standard was designed specifically to measure children's height, thus it is a more accurate measuring device. Although it is an appropriate method of evaluating the impact of the Family Nutrition Improvement Programme on the children's status, a comparative analysis cannot be carried out.



## 2.5 Characteristics of the Respondents

### 2.5.1 Demographic Characteristics

Village registration data indicate that Blulukan is inhabited by 581 families, a total of 3156 residents. Singopuran contains 492 families with a total of 2888 inhabitants.

Table 2-1: Population by Age and Sex

Age group (years)	Blulukan			Singopuran		
	Male	Female	Total	Male	Female	Total
0 - 4	254	278	532	287	270	557
5 - 9	198	191	389	199	167	366
10 - 14	198	187	385	194	164	358
15 - 19	147	171	318	149	168	317
20 - 24	148	149	297	116	133	249
25 - 29	141	135	276	103	114	217
30 - 39	128	131	259	133	130	263
40 - 49	135	137	272	132	137	269
50 - 59	96	120	216	90	96	186
60 +	102	110	212	47	59	106
Total	1547	1609	3156	1450	1438	2888

Source : Village Administrative Office of Blulukan and Singopuran, Central Java, Indonesia, 1986

From the figures in Table 2-1, estimates can be made of the average number of living persons in each family. In Blulukan, each family consists on average of about 5.4 persons. It is about 5.1 in Singopuran. In the sample, the average number of living persons of the respondent's

family in both villages is about 5.4. The average number of children aged under five years is about 1.1 in Blulukan and 1.2 in Singopuran. Respondents in the sample had an average number of 1.4 children aged under five years. The average age of the youngest child in this study is about 31 months, ranging from one month to sixty months.

The number of children aged under five years who joined the Family Nutrition Improvement Programme is quite similar in the two villages studied. In the two villages, Blulukan had a higher number of nutrition cadres than Singopuran.

Table 2-2: Number of Weighing Posts, Cadres and Children under the Programme in the Two Villages

I t e m s :	Blulukan	Singopuran
1. Weighing Posts	5	4
2. Cadres :		
2.1. Active	31	13
2.2. Not active	19	10
3. Children possessing growth monitoring cards	215	210

Source : Village Administrative Office of Blulukan and Singopuran, Central Java, Indonesia, 1986

Table 2-2 shows that the ratio of nutrition cadres to children under the programme is better in Blulukan than in Singopuran. In Blulukan, for example, one active cadre serves seven children, but in Singopuran one active cadre serves sixteen children.

Demographically, the conditions for children under five in the two villages are not particularly favourable. The total number of siblings on average in each family is quite high, while the birth interval between them is comparatively short.

### 2.5.2 Socio-economic Characteristics

Factors like education, types of job, family income, family wealth, and size of house are discussed here as they form part of the socio-economic background of the community and the respondents in this study.

Table 2-3: Education Levels of Residents in the Study Villages

Education :	Blulukan		Singopuran	
	Freq.	%	Freq.	%
1. No education/ Not yet at school	505	16.0	802	27.2
2. In primary school	532	16.9	619	21.0
3. Primary school dropped-out	287	9.1	97	3.3
4. Primary education	632	20.0	501	17.0
5. Secondary education	592	18.8	347	11.8
6. University education	25	0.8	63	2.1
7. Unknown	583	18.4	521	17.6
Total	3156	100.0	2950	100.0

Source : Village Administrative Office of Blulukan and Singopuran, Central Java, Indonesia, 1986

Table 2-3 shows that in general the community of Singopuran has a lower level of education than Blulukan. In the sample, most mothers in the two villages, nearly 80 per cent, had at least some primary education; about 25 per cent had some secondary education as well. Thus, the mothers who joined the Family Nutrition Improvement Programme have various levels of education. All fathers had at least some education and over half had some secondary or higher education.

Both villages exhibit a limited economy. In Blulukan, for example, there were several private factories such as a saw mill, and batik clothing industry, as well as transport companies and several kinds of cottage industries which employed many people. In Singopuran, there was one tobacco drying factory and some transport companies.

Table 2-4: Population in the Study Villages Age 10 and over  
by Type of Employment

Types of employment	Blulukan		Singopuran	
	Freq.	%	Freq.	%
1. Farmer (land owner)	197	8.8	126	6.4
2. Farm labourer (landless)	189	8.5	114	5.8
3. Retailer, Cottage industry, Transport	43	2.0	32	1.6
4. Factory workers	587	26.2	246	12.5
5. Building workers	399	17.8	279	14.2
6. Gov. Officer/Army	101	4.5	113	5.8
7. Pensioners	18	0.8	37	1.9
8. Others (old people, Unemployee, at school)	701	37.4	1018	51.8
Total	2235	100.0	1965	100.0

Source : Village Administrative Office of Blulukan and Singopuran, Central Java, Indonesia, 1986

The working population (those aged 10 years or older) occupy a range of jobs. Table 2-4 shows that the highest proportion of jobs was held by factory workers in Blulukan (26.2 per cent). Building workers constituted the highest proportion in Singopuran (14.2 per cent). Farmers and farm labourers constitute nearly the same proportion in both villages.

The fathers (husbands) of respondents in the study held a variety of jobs in the two villages. For example, most of the fathers were government officers/army and factory workers (40.8 per cent, n=147). Farmers (land owners) and retailers formed about 7.5 per cent, skilled labourers formed 13.6 per cent while farm and unskilled labourers form 19.1 per cent.

In this study, about half of the female respondents did not work. Those mothers who worked were employed in a variety of jobs including government offices, factory work, retail/home industry, and farms. A number were temporary workers or in the category of others. Many mothers, particularly those who were government officers and factory workers, commuted to work in the City of Surakarta.

About 48.3 per cent of the families were considered to have a low monthly income (up to Rp.40,000), 36.1 per cent had a middle income (Rp. 40,001 - Rp.75,000), while only 8.8 per cent were in the high income bracket (above Rp.75,000). The monthly average family income was about Rp.22,000. About 6.8 per cent did not reply to questions about income. In early 1986 when this study was carried out, one Australian dollar was equal to about 780 rupiahs.

An analysis of the wealth of the families (reflecting an accumulation of the value of the household property) found that 51.1 per cent of the families could be considered as having little wealth, (up to Rp.50,000), 28.6 per cent had moderate wealth (Rp.50,001- Rp.120,000) and 20.3 per cent were wealthy (Rp.120,000 and more).

About 40.0 per cent of the respondent's families lived in small houses (100 - 289 squares meter), while 34.1 per cent of the families lived in medium size houses (290 - 590 sq.m.) and only 12.2 per cent of the families lived in large houses (591 sq.m. and more). Furthermore, 13.6 per cent families rented their houses. They tended to be migrants.

To summarize, the two villages implemented the nutritional programme at the same time. However Blulukan had better methods of organizing programme activities than Singopuran. The two villages had almost the same socio-economic background. They are both also highly accessible to the City of Surakarta, with its greater social and economic resources. Both villages, therefore, have an excellent opportunity to acquire full modern health services and access to

physicians, clinics, and hospitals. Both villages are well placed for easy access to new health information on family health maintenance.

### CHAPTER 3

#### KNOWLEDGE, ATTITUDE AND PRACTICE OF THE PROGRAMME

##### 3.1 Introduction

The knowledge of, and attitude towards the programme and practice of the programme activities by the mothers identify the extent of their participation. Many factors such as demographic and socio-economic characteristics affect the participation of mothers in programme activities. Demographic characteristics (age of mother and total number of siblings) indicate time and experiences of caring for children, which may influence the regularity of mothers' participation in the programme operation. Socio-economic characteristics such as mother's education reflect rational judgement, because an educated mother is more likely to have knowledge than an uneducated mother, and income can provide financial support for mothers which may influence their degree of participation in the programme. This chapter describes the mother's KAP of the programme activities. It also demonstrates the relationships between some demographic characteristics and socio-economic characteristics and these KAP factors. Maternal behaviour in caring for children is also described.

##### 3.2 Knowledge of the Family Nutrition Improvement Programme

The message of the FNIP makes the mothers aware of the importance of a greater investment in health for their children. The FNIP has several aspects such as nutrition education, child weighing, provision of several types of medicines and vitamins, and provision of food supplements. These aspects of the programme are implemented in most villages of Indonesia.

The respondents of this study were asked about the FNIP. All

respondent knew the existence of the programme in their villages. Sixty-nine per cent of mothers knew the name of the programme. Of those knew about the programme, 72 per cent had correct knowledge about the name of some aspects of the programme.

In principle, the growth monitoring card provides a method of recording and observing the physical growth of children under five years old, as indicated by increased weight (Tarwotjo et al. 1982:38). With regard to the function of the growth monitoring card, 73.5 per cent of mothers claimed to know the function of the card. Of those, 89.8 per cent answered correctly that the function of the card was to record and monitor the physical growth of children.

Nearly all the mothers in the communities under study knew about the the existence of nutritional education in their villages. Furthermore, 96 per cent knew the name of the medicines and vitamin A which are available at the weighing post, and almost all of the mothers (97.3 per cent) also knew about the availability of supplementary food for their children at the weighing post.

The source of knowledge of the programme is varied. Table 3-1 shows clearly that the wife of the hamlet headman was the most popular source of knowledge about these aspects of the programme. The Health Centre staff, particularly doctors and mid-wives, were the second most important source of information. This was also the case in the study by Singarimbun et al. (1986) in rural Indonesia. It was not widely known that the nutrition cadres could also provide information on aspects of the programme. Perhaps the cadres are not taking an active enough role in this phase of the programme operation.

However, the proportion of "no answer" for source of information was higher within the nutrition education than for other aspects of the programme. This was the case with mothers who were not informed about the operation of the nutrition education programme by the nutrition cadres. The above findings show that most mothers who have children under five years old and who had the growth monitoring cards were familiar with the programme and knew the purpose and usefulness of the nutritional programme for the growth of their children. The wife of the hamlet headman played the most significant role in introducing the programme.



Table 3-1: Source of Knowledge of  
Various Aspects of the Programme [%]

Source of Knowledge	Aspects of Programme			
	1	2	3	4
1. Hamlet Headman's wife	87.1	60.5	72.1	82.3
2. Health cadres	0.7	1.4	0.7	0.7
3. Faml.planning field workers	1.4	0.7	1.4	1.4
4. H.C. staff; doctor, mid-wife	8.2	12.9	19.7	10.2
5. Others	2.0	2.1	2.0	2.0
6. No answer	0.6	22.4	4.1	3.4
Total	100.0 (n=147)	100.0 (n=147)	100.0 (n=147)	100.0 (n=147)

Source : The case-study of Blulukan and Singopuran,  
Central Java, Indonesia, 1986

Note : 1. Child weighing  
2. Nutrition education  
3. Provision of medicines and vitamin A  
4. Provision of supplementary food

### 3.3 Practice of Programme Activities

The participation of mothers in aspects of the programme which are available at the weighing post and other programme activities could help the mother solve the potential problem of malnutrition of their children. However, the extent to which the mothers participate in the programme's organization varies, particularly at the sub-district, village, and hamlet level. It is hypothesized that maternal participation in the programme activities such as child weighing; attending sessions on nutrition education; receiving first aid (high dosage of vitamin A, iron folate, and oralyte salt); and receiving food supplements are high, because the service delivery of the programme is well organized.

The data regarding the mother's participation in the programmes showed that all the mothers had ever weighed their children. About 80.0 per cent of the mothers said that they weighed the children regularly (each month). Seventy-three per cent of mothers said that they attended the nutrition education sessions. Of those mothers who attended the education sessions, 38.1 per cent attended regularly, while 38.1 per cent attended the session irregularly, and 23.8 per cent of mothers never attended. Mothers who attended less frequently or who never attended did so either because they had not been informed of the sessions (8.8 per cent), they had conflicting work commitments (17.7 per cent), or they did not know about nutrition education (8.9 per cent).

With regard to provision of nutritional first aid (high dosage vitamin A, iron folate and oralyte salt), not all of the children received all of the substances. Ninety-six per cent of mothers had received vitamin A for their children. Of those who received vitamin A nearly 60.0 per cent regularly received it, while 39.2 per cent received it only rarely.

Ideally, supplementary food from the programme was only given to the children who could not achieve their normal weight without it or who showed faltering growth. However, in practice, only those children who came to the weighing post had the opportunity to receive the food supplements. Eighty-seven per cent had received supplementary food. Among those who received the food, 74 per cent were regular receivers and 26 per cent receive it irregularly. All of the above findings show that all of children involved in the programme regularly received food supplements.

The duration of the period of participation and the reasons the mothers gave for participating in the Family Nutrition Improvement Programme reflect the actual level of knowledge and awareness of mothers of the programmes. Data show that the mean duration of participation in the programme was about six months, ranging from one to sixty months. The reasons the mothers gave for coming to nutritional education were varied. The major reason given was that mothers wanted to know how to provide a better diet for their family, especially children under five years (60.0 per cent). Ninety per cent of the mothers said that by regularly receiving the supplementary food, they were able to contribute to the improvement of the nutritional status of their children.

### 3.4 Effect of Demographic Characteristics on Participation in Programme

The demographic characteristics of the mother, such as her age and number of living children, may affect her participation in the activities of the programme. The older women are more likely to be able to make positive decisions about the programme. The number of living children in a family indicates the time available to the mother for involvement in the activities of programme, such as nutrition education and child weighing. This could work both ways : (1) more children indicates less time available (2) more children indicate more time available, if the older children are able to take care of younger ones.

In regard to the nutrition education, two hypotheses were developed. First, the older the mother, the more frequently she attends the sessions on nutrition education. Second, the more living children the mother has, the less frequently the mother attends the sessions of nutrition education. The testing of the second hypothesis is shown in Table 3-3.

Table 3-2: Percentage of Attending Nutrition Education  
by Age of Mother

Freq.of attending nutrition education	Age of mother (year)		
	< 25	25 - 34	35 +
Regular	40.4	38.4	31.8
Irregular	30.8	38.4	54.5
Never	28.8	23.2	13.7
Total	100.0 (n=52)	100.0 (n=73)	100.0 (n=22)

Source : The case-study of Blulukan and Singopuran,  
Central Java, Indonesia, 1986

Table 3-2 shows that the proportion of mothers who regularly attended the sessions of nutrition education decreased with increasing age of mother. However, the highest proportion of mothers who never

attended the sessions of education were aged less than 25 years, and the proportion never attending decreased with increasing age of mother. This is in contrast to the hypothesis. Statistically, the age of mother was not significantly associated with her attendance at the sessions on nutrition education (chi-square=4.16, P=0.39). Hence, the hypothesis is not supported, and the interpretation of the trend is made more difficult by the contradictory results noted above.

Table 3-3: Percentage of Attending Nutrition Education  
by Number of Living Children

Freq. of attending nutrition education	Number of Living Children			
	up to 2	3 - 4	5	+
Regular	36.1	45.7	31.0	
Irregular	32.0	41.3	48.3	
Never	31.9	13.0	20.7	
Total	100.0 (n=72)	100.0 (n=46)	100.0 (n=29)	

Source : The case-study of Blulukun and Singopuran,  
Central Java, Indonesia, 1986

Table 3-3 shows that the proportion of mothers who regularly attended the nutrition education sessions was lowest, 31 per cent, among those who had five or more children compared to those with less than five children. The proportion of mothers who regularly attended education sessions was highest for those who had three to four children. On the other hand, the proportion of mothers who never attended was the group of mothers who had less than two children, which again makes difficult the interpretation of these results. The number of living children was not significantly associated with the frequency with which the mother attended education sessions, and thus the hypothesis is not supported.

Table 3-4: Percentage of Mothers Weighing Children  
by Age of Mother

Freq. of child weighing	Age of Mother		
	< 25	25 - 34	35 +
Regular	82.7	93.2	71.4
Irregular	17.3	6.8	28.6
Total	100.0 (n=52)	100.0 (n=73)	100.0 (n=22)

Source : The case-study of Blulukan and Singopuran,  
Central Java, Indonesia, 1986

With regard to child weighing activities, two hypotheses are developed. Firstly, the older the mother, the less regularly she will weigh her children. Table 3-4 shows that the proportion of mothers who regularly weighed their children was higher for younger mothers (aged less than 25 years, and between 25 and 34 years) than for older mothers (aged 35 years or more). The highest proportion was for mothers aged between 25 and 34 years. However, the frequency of child weighing was significantly associated with the age of the mothers, and thus the hypothesis was supported ( $\chi^2=7.40$ ,  $P=0.03$ ).

The second hypothesis is that the more living children, the less frequently the mother will weigh her children. Table 3-5 shows that the proportion of mothers who regularly weighed their children was higher for mothers who had fewer living children (less than two children, and between three and four children) than for the mothers who had more children (five children or more). The highest proportion of mothers who regularly weighed their children was the mothers of three to four children. However, the number of living children was not significantly associated with the frequency with which the mothers weighed their children at the weighing post. This finding does not support the hypothesis.

In addition, the age of children who were regularly weighed varied.

Table 3-5: Percentage of Mothers Weighing Children  
by Number of Living Children

Freq. of child weighing	Number of Living Children			
	up to 2	3 - 4	5	+
Regular	87.5	93.5	71.4	
Irregular	12.5	6.5	28.6	
Total	100.0 (n=72)	100.0 (n=46)	100.0 (n=29)	

Source : The case-study of Blulukan and Singopuran,  
Central Java, Indonesia, 1986

For example, the proportion of children who were regularly weighed tended to decrease with children's increasing age. Of children aged less than 12 months 91.4 per cent were weighed regularly, compared with 87.5 per cent of children aged between 12 and 23 months, and 81.0 per cent of children aged between 24 and 36 months. But the proportion of children regularly weighed increased again for children aged 36 months or more, 86.2 per cent.

### 3.5 Child Care Behaviour

Child care behaviour includes feeding habits, monitoring the growth of children and breastfeeding practices. Feeding habits can be identified by observing whether the mothers provides special food for children under five years or not. As mentioned in section 1.4, according to Martorell, (1980) children need relatively need more energy than adults for physical growth and intellectual development.

The mother's provision of special food for children indicates better feeding practices for children under five than if the same food is given to all members of the the family (children and adult). In order to determine whether the mothers in the study villages have habitually prepared special food for their children for the purpose of improving the children's physical growth, this study collected information on

feeding habits. Mothers were asked whether they fed children under five years with the food prepared for the whole family. The answer to this question showed that 70.7 per cent of the mothers fed children aged less than twelve months with the same food as the whole family. About half of these mothers said that they did so because the food contained "adequate energy" required by the children. Other reasons mentioned were that the children were willing to eat such food (41.3 per cent), and the remaining mothers were concerned with factors of time and labour efficiency in food preparation (10 per cent).

Only mothers with children aged less than 12 months (29.3 per cent) prepared special food all of the time for their children. For this, they gave some reasons. Fifty-four per cent stated that the children needed food with more energy and that they would not eat the family's food. Forty per cent of those mothers mentioned that their children were still breastfed and needed special food, while the rest did not give any reasons for preparing special food.

Growth of children is ideally indicated by their weight gain according to age (WHO, 1983). Data were therefore gathered to determine if the mothers knew that the growth of children was identified by the weight-for-age indicator. When the mothers were asked how they knew if the child was growing well, almost all mothers understood that the growth of their children could be identified from the weight gain corresponding to age (83.7 per cent). Other mothers said that their children almost never get sick (5.4 per cent). Still others said that they were active and talkative (3.4 per cent), or had a large appetite (1.4 per cent). Very few mothers (6 per cent) did not mention any method of identifying how well their children were growing.

Breastfeeding practices can be identified by investigating how frequently and often the children were breastfed. children should be breastfed for at least six months duration in order to grow normally. Data collected in this study relating to breastfeeding practices show that almost all of the mothers breastfed their children at some stages. About 23.1 per cent mothers were currently breastfeeding. Ten per cent of mothers had ever breastfed their children for up to six months, 13.9 per cent for six to 12 months, and 22.0 per cent for 12 to 18 months. The highest proportion of women breastfed their children for between 18

and 24 months (37.2 per cent). The proportion of mothers who breastfeed for more than 24 months was 16.9 per cent.

In summary, all mothers who had children under five years old and who were involved in the Family Nutrition Improvement Programme knew about the existence of the programme. They understood the purpose and usefulness of the programme for the promotion of health of children. The wife of the hamlet headman played the most significant role in introducing the programme.

The participation of the mothers in nutrition education, child weighing, provision of nutritional first aid (medicines and vitamin A), and provision of food supplements was high. This was due to the well organized service delivery of the programme. However, the relationships of the demographic and socio-economic characteristics of the mothers to their participation in the programme activities were not statistically significant.

Most children under five years involved in the programme were likely to be eating the same food as the whole family. Most mothers participating in the programme said that improvement in weight-for-age was the best indicator of the growth of their children. Almost three-quarters of the mothers breastfed their children, with the highest proportion breastfeeding until children were aged between 18 months and 24 months.

### 3.6 Effect of Socio-economic Factors on Participation in The Programme

The adoption of the message of the Family Nutrition Improvement Programme was influenced by the socio-economic background of the family. Education and income more commonly affect the degree of adoption of program aspects such as nutrition education and child weighing.

With regard to nutrition education, two hypotheses are developed. The first is that the higher the education of the mother, the more frequently she will attend nutrition education sessions.

Table 3-6 shows that the proportion of mothers who regularly attended nutrition education sessions tended to rise correspondingly with the mother's increasing level of education. Conversely, mothers who



Table 3-6: Frequency of Attending Nutrition Education  
by Mother's Education

Freq.attending Nutrition.educ.	Mother's Education		
	Secondary educ.or higher	Primary educ.	No Education
Regular	50.0	44.6	44.0
Irregular	43.8	50.8	36.0
Never	6.2	4.6	20.0
Total	100.0 (n=36)	100.0 (n=80)	100.0 (n=31)

Source : The case-study of Blulukan and Singopuran,  
Central Java, Indonesia, 1986

never attended the sessions were found to have lower levels of education. However the differences were small and not statistically significant, and therefore it was not possible to prove this first hypothesis (chi-square=3.99,  $P=0.41$ ).

The second hypothesis is that the higher the family income, the more frequently the mother would come to the education sessions.

Table 3-7 shows that the proportion of mothers who regularly attended the education sessions tended to increase corresponding to the mother's increasing income. The high income group of mothers may have been highly motivated to understand nutrition. The middle income group of mothers may have been those who were encouraged by the nutrition cadres to continually attend the sessions. Statistically, however, there was no significant association between family income and the mother's frequency of attending nutrition education sessions (chi-square=4.74,  $P=0.31$ ).

Regarding child weighing, two hypotheses were developed. First, the higher the education of mother, the more frequently she would have her child weighed.

Table 3-7: Frequency of Attending Nutrition Education by Income

Freq.of attending nutrition education	Family Income		
	High	Middle	Low
Regular	50.0	37.7	34.3
Irregular	29.2	45.3	35.7
Never	20.8	17.0	30.0
Total	100.0 (n=24)	100.0 (n=53)	100.0 (n=70)

Source : The case-study of Blulukan and Singopuran,  
Central Java, Indonesia, 1986

Note : High = Rp.75,100 or more  
Middle = Rp.40,100 - Rp.75,000  
Low = Up to Rp.40,000

Table 3-8: Frequency of Child Weighing by Mother's Education

Freq.of child weighing	Mother's Education		
	Secondary educ.or more	Primary educ.	No Education
Regular	86.1	87.5	83.3
Irregular	13.9	12.5	16.7
Total	100.0 (n=36)	100.0 (n=80)	100.0 (n=31)

Source : The case-study of Blulukan and Singopuran,  
Central Java, Indonesia, 1986

Table 3-8 shows that the proportion of the mothers who regularly weighed their children at the weighing post was slightly higher among educated mothers (primary education and secondary education or higher) than among mothers who had no education. Furthermore, the percentage who "never weigh" was higher for those with no education. However, the difference was very small and not statistically significant. This shows

that the findings do not prove the hypothesis ( $\chi^2=0.32$ ,  $P=0.85$ ). The second hypothesis is that the higher the family income, the more frequently the mother would weigh their children.

Table 3-9: Frequency of Child Weighing by Family Income

Freq. of child weighing	Family Income		
	High	Middle	Low
Regular	79.2	90.6	85.5
Irregular	20.8	9.4	14.5
Total	100.0 (n=24)	100.0 (n=53)	100.0 (n=70)

Source : The case-study of Blulukan and Singopuran,  
Central Java, Indonesia, 1986

Note : High =Rp.75,100 or more  
Middle=Rp.40,100 - Rp.75,000  
Low =Up to Rp.40,000

Table 3-9 shows that the proportion of mothers who regularly weighed their children was higher, in contrast to the hypothesis, among the mothers of low and middle family income brackets than among mothers of the high income group. The highest proportion of mothers who regularly weighed their children was mothers of the middle income group. This group of mothers was presumed to be those who more easily motivated by the wife of the hamlet headman and the cadres than the other income groups of mothers to join in the child weighing activity. Statistically, the relationship between mother's education and the frequency of child weighing was not significant ( $\chi^2=1.89$ ,  $P=0.39$ ). Hence, the hypothesis is not supported.

The above descriptions show that the mother's level of education and income do not have any statistically significant association with their participation in programme activities such as nutrition education and child weighing. However, maternal education tends to be associated with attendance at the nutrition education sessions.

## CHAPTER 4

### NUTRITIONAL STATUS OF CHILDREN

#### 4.1 Introduction

This chapter examines the current nutritional status of children aged under five years who were involved in the Family Nutrition Improvement Programme. The children were previously considered as under nourished by the nutrition cadres supervised by the Health Centre staff, as measured by weight for age on the WHO/NCHS standard. After a certain period of time, they are expected to have improved (compared to before the programme) nutritional status as compared to the WHO standard. Nutritional status of children by weight-for-age on the WHO standard was classified into three : below normal (malnourished), normal, and above normal (over nourished). This classification was based on the cut-off point of the standard deviation's score of the children's weight-for-age, that is  $-1.50$  and  $+1.50$  (WHO, 1983:28). This chapter will describe the distribution of the age and weight of children, and the classification of nutritional status of children according to weight-for-age of the WHO standard.

#### 4.2 Age of Children

As mentioned in subsection 2.1.3, only the youngest child in each family is considered in the tables in this chapter. The involvement of children in the programme activities is identified by the possession of a growth monitoring cards. Information on the age of the children had been recorded from the cards, and verified by their mothers.

The age distribution ranges between one month and 60 months, with an average age of about 13 months. The proportion is higher in certain ages, for example, exactly 12 months, 9.5 per cent, exactly 18 months, 10.2 per cent, exactly 24 months, 15.6 per cent, exactly 30 months, 8.2

per cent, exactly 36 months, 10.9 per cent, exactly 48 months, 8.2 per cent. The proportion of children of other ages was less than 5 per cent. This shows age heaping in multiples of six months.

Table 4-1: Age Group Distribution of Children

Age group (in months)	Frequency	Percentage
< 6	10	6.8
6 - 11	10	6.8
12 - 17	14	9.5
18 - 23	16	10.9
24 - 29	24	16.3
30 - 35	14	9.6
36 - 39	17	11.6
40 - 44	11	7.5
45 - 49	13	8.8
50 - 54	13	8.8
55 - 60	5	3.6
T o t a l	147	100.0

Source : The case-study of Blulukan and Singopuran,  
Central Java, Indonesia, 1986

Classification of the age of children corresponding to stages of their growth is presented below. Table 4-1 shows fewer at ages less than 12 months. This indicates that few children under the age of 12 months exhibit symptoms of malnourished. More children aged between 12 and 29 months were present. They may be those children who were weaned. A smaller number of children aged between 30 and 60 months were included. This probably indicates the impact of programme activities on them.

### 4.3 Weight for Age of Children

Data on the body weight of individual children were derived from the last record shown in the growth monitoring cards. Weight-for-age of children is one of the anthropometric measures of nutritional status. As age increases, so the children's weight normally also increases.

Weight for age is expressed in this study as the score of the standard deviation (SD) value of weight-for-age from the median of the corresponding measurement (WHO standard) given separately for boys and girls. The SD value of the weight for age (W/A) standard is considered to be an indicator of the nutritional status of children.

Table 4-2: Distribution of Nutritional Status of Children

Nutritional status (SD of W/A)	Frequency	Percentage
+ 3 SD	1	0.7
+ 2 SD	3	2.0
+ 1 SD	6	4.1
Median	30	20.4
- 1 SD	77	52.4
- 2 SD	21	14.3
- 3 SD	9	6.1
T o t a l	147	100.0

Source : The case-study of Blulukan and Singopuran,  
Central Java, Indonesia, 1986

The distribution of the SD value of the W/A according to the population reference shows the comparison between the observed weight-for-age and the weight-for-age of the WHO standard. Table 4-2 shows that the highest proportion one standard deviation below the

median. Three children only were found to be in the group with the highest nutritional status (two SDs above the median). The distribution of the SD value is skewed.

As previously mentioned, the SD score was classified according to the 1.50 cut-off point to classify the nutritional status of children into "normal" and "below normal" (malnourished).

Table 4-3: Distribution of Nutritional Status of Children  
by Villages

Nutritional status (SD score of W/A)	Blulukan	Singopuran
+ 1.50 or higher (over-nourished)	2.7	1.4
- 1.50 - + 1.50 (normal)	49.4	75.6
< - 1.50 (malnourished)	47.9	23.0
T o t a l	100.0 (n=73)	100.0 (n=74)

Source : The case-study of Blulukan and Singopuran,  
Central Java, Indonesia, 1986

Table 4-3 shows that generally children within Singopuran had relatively better nutritional status than children in Blulukan. Twenty-three per cent of children in Singopuran were malnourished, while about 47.9 per cent of children were malnourished in Blulukan. Statistically, the nutritional status of the children in the two villages was significantly different (chi-square test at  $P > 0.01$ ). This difference seems to be associated with different factors such as number of nutrition cadres, method of organizing programme activities, and number of weighing posts. However, most children in both villages show normal nutritional status.

Because there are few in the category higher than +1.50, this category will be grouped with -1.50 - +1.50. Therefore, the following discussion will use two categories of nutritional status: less than -1.50 (malnourished) and -1.50 or higher (normal).

## CHAPTER 5

### DETERMINANTS OF NUTRITIONAL STATUS OF CHILDREN

#### 5.1 Introduction

From the literature review it is expected that the level of the nutritional status of children aged under five years will be associated with demographic and socio-economic characteristics and the mother's knowledge, attitude and practice of the Family Nutrition Improvement Programme. Changes in demographic characteristics, improvement of the socio-economic conditions of families, and participation of the mother in programme activities, will be expected to affect the betterment of the children's nutritional status. This chapter describes the effect of demographic and socio-economic characteristics and the mother's KAP of the programme on the children's nutritional status.

#### 5.2 Demographic Differentials, with regard to Nutritional Status

Some of the determinants identified earlier in the child's nutritional status are age and sex of child, sibling under the age of five years and number of living children (total number of siblings). Demographic factors are presumed to be significantly associated with the child's nutritional status as measured by the weight for age standard.

##### 5.2.1 Age of child

Table 5-1 shows that the proportion malnourished is higher among children aged 24 - 35 months and 36 - 60 months than among those aged less than twelve months. However the children aged 12 - 23 months were the most malnourished group. In other words, "normal" children were mostly found among children aged less than one year. However, statistically, there was no significant association between the age of children and their nutritional status.



Table 5-1: Percentage of Nutritional Status of Children  
by Demographic Characteristics

Factors :	Nutritional Status (SD Score of W/A)	
	Malnourished ( $< -1.50$ )	Normal ( $-1.50$ and over)
1. All children (n=147)	35.4	64.6
2. Age of children (months)		
$< 12$ (n=21)	23.8	76.2
12 - 23 (n=30)	50.0	50.0
24 - 35 (n=38)	31.6	68.4
36 - 60 (n=42)	34.5	65.5
3. Sex of Children		
Boy (n=72)	31.9	68.1
Girl (n=75)	38.7	61.3
4. Siblings under Five		
None (n=105)	32.4	67.6
One (n=42)	42.9	57.1
5. Number of children in the family		
1 - 2 (n=72)	27.8	72.2
3 - 4 (n=46)	41.3	58.7
5 and more (n=29)	44.8	55.2

Source : The case-study of Blulukan and Singopuran,  
Central Java, Indonesia, 1986

Commonly in developing countries, children aged up to six months tended to increase in weight normally, and increase slightly up to the age of one year. Then, weight gain fluctuates for children aged up to two or three years (Passmore et al. 1984; Kardjati et al. 1979; Brooks, 1980; and Fajan et al. 1983). Nutritional demands are high during the period of rapid growth in early childhood (ages up to six months). This age group is most commonly affected by the progressive transition in types, quantity, and quality of food (Taylor et al. 1982; Vahlquist, 1977). This situation is more frequently unrecognized by mothers. Moreover, when mothers wean their children early and do not provide them with sufficient food supplements, children have lower nutritional

status. However, this study found that the proportion of malnourished children aged less than 12 months was low, because most were being breastfed (73.2 per cent).

#### 5.2.2 Sex of Child

The data in Table 5-1 also indicate that boys more commonly had better nutritional status than girls in the two villages studied. The proportion of malnourished girls was higher than among boys according into the reference population of weight for age. However, the association between sex of children and their nutritional status is not statistically significant.

Kardjati et al. (1978) in East Java, Soekirman (1983) in Central Java, Bairagi (1980) in Bangladesh, Kimmance (1972) in Jordan and Ballweg (1972) in Haiti also documented the same result in their studies. They all found that boys had higher nutritional status than girls. Tanner (1978:5) mentioned that girls were typically lighter and slightly smaller than boys at ages under five years. Chen (1979) noted that some cultures commonly show a preference for male children and thus may neglect female children, with the consequence that the female children are more likely to become malnourished.

#### 5.2.3 Siblings Under the Age of Five Years

From the perspective of the mother's role as children's care giver, having more than one child within the age group up to five years will possibly lead mothers to have less time for paying attention individually to their children. Children need sufficient care, particularly with regard to feeding, in order to grow normally.

Table 5-1 shows that the proportion of malnourished children is lower among those with no older sibling than among those with one older sibling. This indicates that there is an association between the number of older siblings and child's nutritional status. However, the association is not statistically significant.

Kardjati et al. (1979) found a significant negative association between higher numbers of older siblings and the youngest children's nutritional status. Other studies (such as Wolff, 1965; Wray and Aguirre, 1969; and Marchione, 1979) showed the same result. This is due

to inequalities of food distribution among children, and food competition without sufficient control from mothers. Generally this leads to children becoming malnourished (Cassidy, 1979).

#### 5.2.4 Total Number of Siblings

The number of children in a family has implications for the extent of the mother's duties as children's care giver. The more children in a family the more the nutritional status of children aged under five years is affected. Negative effects may possibly occur when there are a large number of children because the care given to the children through feeding and the monitoring of growth is commonly disturbed.

Table 5-1 shows that the proportion of malnourished children is higher when there are three or more children in the family than when there are only a small number (1 - 2) of children in a family. This indicates a negative association between a large number of living children in a family and the lower nutritional status of the youngest children. However, the association is not statistically significant.

Many studies have observed a significant negative association between these two variables. Such studies include those of Robson et al. (1972), Marchione et al. (1979), Wolf and Behrman (1982), Gupta and Srivasta (1977), MacCorquodale and de Nova (1977), Mukherjee and Shetna (1972), Christiansen, Mora and Herrera (1975). The differences found in this study might also have been significant if the sample had been larger.

In conclusion, demographic factors do seem to affect children's nutritional status. The age and sex of the children, number of sibling under five years and the total number of children in the family do affect the nutritional status of the youngest children in a family.

#### 5.3 Socio-Economic Factors

Some socio-economic differentials identified are mother's education, mother's occupational status, father's education, family income, family wealth and size of house. The socio-economic factors are presumed to affect the nutritional status of children under the age of five years.

Table 5-2: Percentage of Nutritional Status of Children  
by Socio-Economic Variables

Socio-economic variables	Nutritional Status (SD Score of W/A)	
	Malnourished ( $< -1.50$ )	Normal ( $-1.50$ and above)
1. Mother's education		
-Secondary educ.or higher(n=36)	19.4	80.6
-Primary education (n=80)	40.0	60.0
-No education (n=31)	41.9	58.1
2. Mother's occupational status		
-Not working (n=75)	26.7	73.3
-Working (n=72)	44.4	55.6
3. Father's education		
-Secondary educ.or higher(n=77)	31.2	68.8
-Primary education (n=70)	40.0	60.0
4. Family income		
-High (n=24)	20.8	79.2
-Middle (n=53)	43.4	56.6
-Low (n=70)	34.3	65.7
5. Family wealth		
-High (n=23)	30.4	69.6
-Middle (n=24)	20.8	79.2
-Low (n=100)	40.0	60.0
6. Size of house (m.sq.)		
-Large (n=50)	46.0	54.0
-Medium (n=47)	25.5	74.5
-Small (n=35)	45.7	54.3
-Not available (n= 5)		

Source : The case-study of Blulukan and Singopuran,  
Central Java, Indonesia, 1986

### 5.3.1 Mother's Education

It is presumed that the higher the education of the mothers the better the nutritional status of the children, and conversely that the lower the education level, the lower the nutritional status. Table 5-2 shows that the proportion of malnourished children was found higher in the group of primary-educated mothers and mothers with no education than among mothers with the highest level of education. However, the association between mother's education and the variation of the children's nutritional status is not statistically significant.

Studies in East Java by Kardjati et al. (1979) and Brooks (1980) also indicate the same result, as did studies by Wray and Aguirre (1969) in Colombia, and Martorell, Leslie and Moock (1984) in Nepal. However the opposite result to this study was found in studies such as Behrman (1982) in India, Battad (1977) in The Philippines, Graham (1972) in Peru, and Pachauri and Marwah (1970) in Nicaragua.

### 5.3.2 Mother's Occupational Status

The working mother more commonly has more money to spend on food than the non-working mother. In turn, the non-working mother has more time to spend caring for children than the working mother. However, the time for caring for children is an important factor affecting children's nutritional status, provided food is freely available. It is presumed that mothers who do not work will have children with better nutritional status than children of working mothers.

Table 5-2 shows that the proportion of malnourished children is higher among working mothers than among mothers who do not work. The proportion of normally nourished children is lower among working mothers than among mothers who do not work. Thus occupational status of the mother seems to have a negative relation with the nutritional status of the children aged under five, according to weight-for-age. Soekirman (1983:178) also observed that mothers who work more than seven hours a day approximately one kilometre from home have smaller and lighter infants in comparison to mothers who do not work.

### 5.3.3 Father's Education

It is normally expected that there is an association between father's education and mother's education within a family. It is hypothesized that the higher the education level of the father, the better the nutritional status of his children aged under five. Table 5-2 shows that the proportion of malnourished children was higher among the children of primary educated fathers than among those children with fathers who had secondary or higher education. This clearly shows that the higher the education level of the father, the more likely were the children to have better nutritional status. Nevertheless, the relation between father's education and children's nutritional status was not statistically significant.

Studies with the same findings include Soekirman (1983), Kardjati et al. (1979), and Wan Muda (1984). However Brooks (1980) in Indonesia, and Whyte (1974) in India found the opposite.

#### 5.3.4 Family Income

The family income (the combined income for the previous month of father and mother) in the villages under consideration ranges from about Rp.20,000 to Rp.400,000 with an average of about Rp.23,000 (Rp. or rupiah is the Indonesian currency, in the early 1986, \$A 1 is equal to Rp.850). In the analysis, the income was categorized into low (up to Rp.40,000), middle (Rp.40,001 - Rp.75,000) and high (above Rp.75,000). It is presumed that the higher the family income, the better the nutritional status of the children under five.

Table 5-2 shows that the proportion of malnourished children in the low income group was higher than in the high income group. However the middle income group had the highest proportion of malnourished children. This suggests that the middle income group may have included the most working mothers, who tend to have negative effect on children's nutritional status. This study observed an insignificant difference between mother's occupational status (working and non-working mother) and family income (chi-square,  $P > 0.05$ ). This may indicate that working mothers do not necessarily improve the family income.

Sayogyo (1973), Kardjati et al. (1979), and Fajan et al. (1983) documented the same result as this study. However, other studies showed different results. These include Soekirman (1983) Brooks (1980), Alisyahbana (1984), Wan Muda (1984), Bairagi (1980) and Becker (1986). The different findings may suggest that different socio-economic characteristics in the communities studied are associated with different behaviour, particularly in regards the feeding habit in families.

#### 5.3.5 Family Wealth

Family wealth comprises the household's goods and possessions: bicycles, livestock (cows, buffalos, pigs, goats, poultry) and luxury goods such as motorcycles, televisions, radios/cassette players, sewing machines, watch/clocks. Wealth was indexed in rupiah as a cumulated value of all items on the basis of current price.

Family wealth in the study ranged from Rp.3,000 up to Rp.200,000. In this analysis, wealth is categorized into low (up to Rp.50,000), middle (Rp.50,001 - Rp.120,000), and high (Rp.120,000 and more). It is presumed that the greater the family wealth, the better the nutritional status of children under five.

Table 5-2 shows that a higher proportion of malnourished children was found among families with little wealth than among families with greater wealth. However, the lowest proportion of malnourished children was observed among families with medium wealth.

The group with medium wealth may have had the largest number of more educated mothers who were aware of the potential malnutrition problem of their children. These mothers tend to purchase more foods than others in order to feed the children well.

The correlation between mother's education and family wealth was negative and significant ( $r = -0.132$  at  $P < 0.05$ ). This means that the higher the education of the mothers the lower the family wealth. Thus the higher educated mothers are more likely to spend their income on foods for their children than on material goods. A negative correlation between family income and family wealth was also observed. However, the correlation coefficient was not significant.

Soekirman (1983:144) also found in Indonesia that household wealth had no significant association with infant feeding practices which directly influence the nutritional status of children under five. However, Bhuiya et al. (1986) found in Bangladesh that household wealth was positively related to children's nutritional status.

#### 5.3.6 Size of House

In this analysis, size of house is presumed to be associated with children's nutritional status. Children living in a bigger house are assumed to have higher economic status, thus they are expected to have better nutritional status. The size of houses is categorized into small (100 - 289 sq.m.), medium (290 - 590 sq.m.), and large (590 sq.m. and more).

Table 5-2 shows that the proportion of malnourished children was higher among those belonging to families with small houses and those with large houses than among those belonging to families with medium

houses. Size of house may indicate the condition of health. It has implications for the health conditions which affect the health of family members, especially children under five. Small houses with larger families are often responsible for transmitting diseases such as diarrhoea, colds, coughs, measles between family members. These diseases are prevalent among people in many parts of Indonesia (Munir et al. 1982). Diarrhoea and measles are responsible for loss of nutrition and often result in poor growth and low resistance to disease (Grant, 1985:44)

Twenty four per cent of the children in this study lived in small houses. The average number of family members is about 5 to 6 persons. The children living in small houses in this study were more likely to be malnourished than those living in medium houses. However, those children living in large houses were also more likely to be malnourished than children living in medium houses. These children may be living together with more than one family in the same house. Houses may belong to an extended family. Thus several households often live in the same house.

About 59 per cent of the mothers in this study mentioned living in the house of their extended family. Fifteen per cent lived together with more than one family. This is more particularly the case with families living in small houses with many people.

Tomkin et al. (1986) observed that children living in "European-style houses" in Gambia, which reflect higher socio-economic status and more hygiene, had better nutritional status (height for age) than children living in "traditional houses", which reflect lower socio-economic status and less hygiene. Becker et al. (1986) also found in Bangladesh that boy's nutritional status is significantly related with the size of house.

#### 5.4 Relevant Mother's Knowledge, Attitude and Practice and Nutritional Status

Nutrition programme activities encourage and assist mothers to improve nutritional status of children under five. The monthly programme activities include nutrition education, child weighing and provision of food supplements. Thus the mothers of the children who have been in the programme for a long time and actively participate in programme activities should have better nourished children.



Table 5-3: Percentage of Children's Nutritional Status  
by Mother's KAP of the Programme

Maternal KAP of programme activities	Nutritional Status (SD Score of W/A)	
	Malnourished ( $< -1.50$ )	Normal ( $-1.50$ )
1. Length of time since joining programme (months)		
- Up to 12 (n=30)	23.3	76.7
- 13 - 24 (n=40)	45.0	55.0
- 25 - 60 (n=77)	35.1	64.9
2. Freq.of attending nutr. education		
- Regular (n=56)	42.9	57.1
- Irregular (n=35)	33.9	66.1
- Never (n=35)	25.7	74.3
3. Freq.of child weighing		
- Regular (n=126)	34.9	65.1
- Irregular (n=20)	40.0	60.0
4. Freq.of receiving food supplements		
- Regular (n=109)	36.7	63.3
- Irregular (n=16)	25.0	75.0
- Never (n=22)	36.4	63.6

Source : The case-study of Blulukan and Singopuran,  
Central Java, Indonesia, 1986

#### 5.4.1 Length of Time Since Joining the Programme

The length of time since joining the programmes is based on one month intervals. In this analysis, the length of time is categorized into three : (1) up to 12 months (short) (2) 13 - 24 months (medium) (3) 25 months and above (long). It is presumed that the longer the mother has been in the programme, the better the children's nutritional status.

Table 5-3 shows that the proportion of malnourished children was not consistently associated with the length of time since joining the programme. This is also the case with normal children. The lowest proportion of malnourished children and the highest proportion of normal children occurred in the group whose mothers had been in the programme for a short time (up to 12 months) and for a long time (25 - 60 months). Those children in the short duration were mostly aged up to 12 months (13.6 per cent, n=20), where they had improved faster to normal W/A than children aged more than 12 months. Those with long durations might be chronically malnourished. Statistically, these two variables are not significantly associated. Fajan et al. (1983:52) also found that the mean level of nutritional status of the children was not related to the length of time of the mother's participation in the programme.

#### 5.4.2 Frequency of Attending Nutrition Education

The frequency of attending nutrition education sessions reflect the the mothers' absorption of knowledge about nutrition, which is useful for children under the age of five years. It is hypothesized that the more frequent the attendance at nutrition education sessions, the better the nutritional status of the children.

Table 5-3 shows that the proportion of malnourished children seemed to increase consistently, corresponding with higher frequency of attending nutrition sessions. In turn, the proportion of normal children decreased consistently in conjunction with the lower frequency of attending these sessions. The mothers who never or less frequently attended the sessions on nutrition education gave some reasons. About nine per cent of mothers had not been informed about the education sessions. Almost 18 per cent of mothers had conflicting work commitments, and 8.9 per cent of mothers who did not know. The association of the variables is not statistically significant. Fajan et al. (1983:66) also found the same result. However, Sayogyo (1978) stated that children of mothers with nutrition education had better nutritional status than those without.

#### 5.4.3 Frequency of Child Weighing

Weighing to monitor children's growth is conducted once a month. From this activity, the children who are regularly weighed can be identified by their physical growth (W/A). It is hypothesized that the greater the regularity of child weighing, the higher their nutritional status.

Table 5-3 shows that the proportion of malnourished children was higher among those who were weighed irregularly than among those children who were regularly weighed. The proportion of normal children was thus lower among those children who were irregularly weighed than among those children who were regularly weighed. The more frequently a child was weighed the better the nutritional status. Nevertheless, statistically the association of the variables is not significant. The same result was also observed by Fajan et al. (1983:66).

#### 5.4.4 Frequency of Receiving Food Supplements

The frequency of receiving food supplements reflects the mothers' awareness of the problem of malnutrition among children, and their intention to solve the problem. In this analysis, the frequency of receiving food supplements was classified as follows: (1) Regular (2) Irregular and (3) Never. It is hypothesized that those children who regularly receive food supplements for more than twelve months would have better nutritional status than those who never received food supplements or only received them irregularly.

Table 5-3 shows that the proportion of malnourished children was higher among children who never received food supplements, and among those who regularly received food supplements, rather than among those children who only irregularly received them. This suggests that malnourished children who never receive food supplements may have belonged to mothers who do not recognize the problem of malnutrition in their children. Malnourished children who regularly receive food supplements may come from poor families. Mothers may have been aware of the malnutrition problem in their children, but they could not provide adequate nutrients on a daily basis, while the food supplements were only available once a month at the weighing post.

Fajan et al. (1983:74) also found the same results as this study.

However, Sayogyo (1978) states that the food supplements positively affected the level of the children's nutritional status. This suggests that children in that experimental study may have more frequently received the food supplements, and received more intensive treatments than children in this study. From the Narangwal experiment in India, Taylor et al. (1982) showed that children in experimental villages who were provided with regular food supplements had better nutritional status than children from the control villages who did not receive any food supplements.

The above description shows that maternal knowledge, attitudes and practices of the Family Nutrition Improvement Programme encouraged the participation of mothers in the programme activities. Nutrition education and child weighing seem to have a clear role in improving the nutritional knowledge of mothers and thereby improving the nutritional status of the children in comparison to other aspects of KAP.

### 5.5 Multiple Classification Analysis

This section discusses the relative importance of a number of socioeconomic characteristics and KAP of the programme affecting the nutritional status of children under the age of five years. Chapter 3 showed that each socio-economic characteristics and KAP of the programme factors are considered to be predictors or independent variables. In this case, the multiple classification analysis (MCA) is used to clarify the proportion of variation of the dependent variable which is explained by the additive effects of all independent variables (socio-economic characteristics and KAP of the programme), while cross tabulation analysis (it is shown in the previous chapter 3) shows the association of each socio-economic characteristics and KAP factors and the dependent variable.

For the purpose of this analysis, two KAP variables were selected: frequency of attending nutritional education sessions and frequency of receiving food supplements. The provision of food supplements has a more direct effect on children's nutritional status than attendance at nutrition education sessions. It is presumed that direct activities within the programme will have more effect on the children's nutritional status than indirect activities.

Three socioeconomic variables, mother's education, mother's occupational status and family wealth, were selected. The first two variables were expected to have a direct influence on children's nutritional status. Family wealth is a household variable which perhaps affects children's nutritional status indirectly.

The dependent variable in Tables 5.4 and 5.5 is nutritional status of children under the age of five years. It is expressed as the score of standard deviation of the weight for age based on the WHO standard (see chapter 2, sub-section analysis).

Two MCA models were developed in this analysis. The first model is based on socio-economic characteristics as independent variables. It solely examines the effect of three socio-economic characteristics of the mother on the children's nutritional status. The second model uses a combination of socio-economic characteristics and the KAP of the program factors as independent variables to assess their impact on nutritional status of children under five.

Comparison of the two models of the MCA was used to determine the extent of the impact of the Family Nutrition Improvement Programme (represented by the KAP variables) on variation in the children's nutritional status. The examination of the covariation of independent variables shows in Appendices 1 and 2 that there was no strong interaction between the independent variables. As strong interaction between independent variables violates the assumptions of MCA, than the absence of interaction allows the use of MCA.

#### 5.5.1 Model I

Table 5-4 shows that 9.1 per cent of variance in the children's nutritional status is explained by the mother's education, mother's occupational status and family wealth. This effect is considered to be slight. Mother's occupational status and mother's education were found to be more correlated with nutritional status of the children than family wealth.

Table 5-4: Multiple Classification Analysis of  
Children's Nutritional Status - W/A: Socioeconomic  
Factors

Grand mean = -1.02

Variable and Category	N	Unadjusted		Adjusted for	
		Dev'n	Eta	independents	Dev'n Beta
<hr/>					
1. Mother's Occupational Status					
- Not working	75	0.26		0.21	
- Working	72	-0.27		-0.22	
			0.23		0.19
2. Mother's Education					
- Secondary educ. or higher	36	0.41		0.27	
- Primary educ.	80	-0.07		-0.05	
- No education	31	-0.29		-0.19	
			0.21		0.14
3. Family Wealth					
-High	23	0.47		0.18	
-Middle	24	0.15		0.13	
-Low	100	-0.14		-0.07	
			0.20		0.09
<hr/>					
Multiple R square					0.091
Multiple R					0.301

Source : The case-study of Blulukan and Singopuran,  
Central Java, Indonesia, 1986

#### 5.5.2 Model II

As in model I, the socioeconomic variables in Model II are mother's education, mother's occupational status and family wealth. The KAP variables are frequency of attending nutrition education and frequency of receiving food supplements.

Table 5-5 shows that 13.7 per cent of the variance in the children's nutritional status is explained by the mother's education, mother's occupational status, family wealth, attendance at nutrition

Table 5-5: Multiple Classification Analysis of Children's  
Nutritional Status - W/A:  
Socioeconomic Factors and Programme Factors

Grand mean = -1.02

variable and Category	N	Unadjusted Dev'n	Eta	Adjusted for independents Dev'n	Beta
1. Freq.of Receiving Food Supplements					
- Regular	109	-0.12		-0.13	
- Irregular	16	0.71		0.62	
- Never	22	0.05		0.21	
			0.22		0.21
2. Mother's Occupational Status					
- Not working	75	0.26		0.23	
- Working	72	-0.27		-0.24	
			0.23		0.20
3. Mother's Education					
-Secondary educ. or higher	36	0.41		0.25	
-Primary education	80	-0.07		-0.03	
-No education	31	-0.29		-0.21	
			0.21		0.14
4. Family Wealth					
- High	23	0.47		0.17	
- Middle	24	0.15		0.10	
- Low	100	-0.14		-0.06	
			0.20		0.08
5. Freq.of Attending Nutrition Education					
-Regular	56	-0.03		-0.10	
-Irregular	56	0.01		0.06	
-Never	35	0.02		0.07	
			0.02		0.07
Multiple R square					0.137
Multiple R					0.370

Source : The case-study of Blulukan and Singopuran,  
Central Java, Indonesia, 1986

education sessions, and receiving food supplements. The effect of those variables is low.

Comparison of the results of MCA Model I and MCA Model II shows that multiple R square of Model II is 4.6 per cent higher than in the Model I (13.7 per cent - 9.1 per cent). This means that the effect of the KAP variables on the children's nutritional status is very low. In other words, the Family Nutrition Improvement Programme has only a slight impact according to this study.

Children's nutritional status examined here is current, whereas the programme is on-going. Hence, the children's nutritional status may

improve or deteriorate over time. Fajan et al. (1983:54) also stated that there was no clear relationship between the improvement of the nutritional status of children under five and participation of their mothers in the programme.



## CHAPTER 6

### SUMMARY AND CONCLUSION

One of the determinant factors associated with the high infant and child mortality rates in Indonesia is nutritional deficiency. A direct approach to the high infant and child mortality rate has been launched in the operation of the Family Nutrition Improvement Programme by the Government of Indonesia. The government hopes that the improvement of the socioeconomic conditions of Indonesian families due to the impact of the National Economic Development of Indonesia may also have an indirect effect on the betterment of the nutritional status of children under five.

This study has attempted to examine the effects of some factors such as demographic and socio-economic characteristics, family background, and the mother's KAP of the Family Nutrition Improvement Programme for the nutritional status of children under five. It is based on the data of a case-study which was collected from December 1985 to January 1986. The major findings are summarized here.

The study found that 35 per cent of children under five were malnourished according to weight-for-age. With regard to the relationship between demographic characteristics and the children's nutritional status, it was found that the lowest proportion of malnutrition occurred among children aged less than one year. This concurs with many findings that in developing countries the weight gain of children aged up to six months tends to increase normally according to the World Health Organization standard, and then up to the age of one year though slightly below the WHO standard. Then it commonly fluctuates for children aged two to three or five years.

This situation is probably due to the adequacy of the mother's breastmilk to support the growth of children up to six months. In the period six months to twelve months, the children still need breastmilk,

and also need adequate food supplements (quantity and quality) in addition to breastmilk to fulfil their nutrient requirements for growth. The growth of the children is somewhat impaired if the mothers do not understand the nutrients required for this age group (Kardjati et al. 1979; Brooks, 1980; Fajan et al. 1983).

Among the children of this study, male children were more likely to have a higher nutritional status than female children. In the developing countries, male children are typically heavier and slightly bigger than female children. This is partially a cultural effect of sex preference as some cultures have a strong preference for male children. Therefore, the care given to boys is commonly greater than that given to girls. As a result, the growth of boys is faster than that of girls. Similar findings from studies in Indonesia were also observed by Kardjati et al. 1978; and Soekirman, 1983.

A lower proportion amongst children with no older sibling under five were malnourished than amongst children who had an older sibling under five. This was probably due to unequal food distribution among siblings under five, and mothers not having enough time to care for more children under five. Cassidy (1979) mentioned that the newly weaned toddler more commonly competes more or less on an equal basis with older siblings for the available food supply.

A negative effect on the children's nutritional status was observed as the number of children living in family increased. This more commonly occurred in low-income families where the distribution of foods was unequal. Hence, the food competition among children in the family could not be avoided. This situation is conducive to children becoming malnourished.

Among the socio-economic variables, mother's occupational status (working or non-working) showed a negative effect on the children's nutritional status. Working mothers exhibited a higher proportion of malnourished children than non-working mothers. Birdsall and Greevey (1978), and Engle (1981) stated that in transitional societies (between traditional and modern societies) the allocation of child-care time often competes with the time needed for income generating work. Thus the mother's essential input time in the production of child health is reduced. Therefore, the children's health is negatively affected. Soekirman (1983:178) also observed the same result.

The mother's education demonstrated a positive effect on children's nutritional status. This supports the statement of Mosley and Chen (1984), and Schultz (1984) that the educated mother can affect her child's survival by her choice in health care practices and by her skill in applying them. She has better information on the optimal allocation of health resources which can produce better health for children at low cost. However, not all studies in Indonesia support these findings (Kardjati et al. 1978; Brooks, 1980; and Fajan et al. 1983).

Other socio-economic variables such as family income, family wealth and size of house did not show a clear effect on children's nutritional status. Sayogyo (1973) mentioned that the income of the family was not the main factor affecting the low nutritional status of children under five. He added that the feeding habits of the family were more commonly the reasons for nutrient deficiencies in young children.

As regards mother's KAP of the Family Nutrition Improvement Programme, it was observed that most of the mothers (70 per cent) knew the name of the nutrition programme that was carried out in their villages. Most, 88 per cent, also understood the function of the growth monitoring card, child weighing, types of medicines available at the weighing post, nutritional education, and the provision of the food supplements.

The most popular source of information about aspects of the programme for the mothers was the wife of the hamlet headmen, 76 per cent. Singarimbun et al. (1986) found similar patterns of information dispersal. The mothers interviewed rarely mentioned the nutrition cadres. This may be because the cadres do not actively take a role in this phase of the programme implementation. However, the cadres were more popular in the operation of the Family Nutrition Improvement Programme. For example in organizing the activity called *arisan*. Because of the *arisan*, mothers are more likely to be encouraged to participate in the programme's operation.

The duration of membership in the FNIP ranged from one to sixty months. The participation of mothers in the activities of the FNIP such as attending education sessions, child weighing, and providing the food supplement for the children at the weighing post was high (about 80 per cent of the mothers mentioned joining in the activities). However, data

in this study showed only a slight effect (1.6 per cent from the MCA) has contributed by the mother's KAP of the FNIP on the children's nutritional status. Therefore, the effect of the mother's KAP of the FNIP on the children's nutritional status could not be definitely explained. This was similar to Fajan et al.'s (1983) observations. Many factors can explain this result. One of the factors may be due to the truncation effect of the period operation of the FNIP. Sayogyo (1973) also mentioned that the inadequate feeding habits of the family negatively affected the children's nutritional status, while the improvement of feeding habits in the family, especially in rural communities, possibly needed a long time.

These findings have achieved the objectives of the study as described in chapter 1, section 1.3, 1.4, 1.5, 1.6; chapter 2, section 2.1 and 2.5; chapter 3; chapter 4; and chapter 5, section 5.2, 5.3, 5.4, 5.5. However, this study has two limitations: (1) small sample size, (2) not all anthropometric measures are available to assess the children's nutritional status. Therefore, interpretation of the findings should be based on the assumption that the children involved in the programme activities will recover from the problem of malnutrition after a certain period of time. Hence, the current information on nutritional status of the children, especially as measured by weight-for-age, is claimed to be the result of the programme operation. On the other hand, it is also the effect of other factors such as demographic and socio-economic characteristics of family.

Although the small sample size meant that most of the relationships were not statistically significant, the patterns of the relationships suggest the following conclusion. The main conclusion of this study is that more siblings under five and more living children in a family, especially among working-mothers, tended to affect negatively the children's nutritional status. Income and family wealth were less likely to affect the children's nutritional status. However, most mothers in this study were actively involved with the programme's activities. Most children were weighed regularly and regularly received food supplements. However, the effect of these two activities on the children's nutritional status is not clear. Furthermore, most mothers regularly attended the nutrition education sessions. The working mothers seem to

be less likely to attend the nutrition education sessions. This still tends to indicate a positive effect on the children's nutritional status, and suggest the continuation of this aspect of the programme will probably be worthwhile for the improvement of the children's nutritional status in the future. In addition, the mother's occupational status (working or non-working) and mother's education seem to be essential considerations in the continued programme operation.

Based on the situation, this study suggests that more effective operation of nutritional education activities for mothers are needed to solve the malnutrition problem of children under five. Especially for the working mothers and those mothers who are less educated, nutrition education should be suitable and available at any time and in any place, so that they can benefit from it.

Spending on food supplements should be reconsidered. The monthly provision of food supplements for children seems to be less worthwhile to improve children's nutritional status. It would probably be useful if food demonstrations were more emphasized in nutrition education sessions. These would then provide more practical information on nutritious food for child, as part of the internalization of improved feeding habits.

For more detailed studies on the determinants of children's nutritional status, it would be necessary to examine the feeding habits of the family and community at different levels of social stratification, and to examine the effect of the feeding habits on the children's nutritional status. This would help in the determination of an effective strategy of nutrition education.

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## APPENDIX

## 1 ANALYSIS OF VARIANCE

SD score by Mother's Occupational Status, Mother's Education and Family's Wealth

---

Source of Variation	Sum of Squares	df	Mean Square	F	Signif of F
Main Effects	17.862	5	3.572	2.703	0.023
Mother's Occupn. Status	6.420	1	6.420	4.959	0.029
Mother's Education	3.038	2	1.519	1.149	0.320
Family's Wealth	1.343	2	0.671	0.508	0.603
2-way Interactions	3.694	8	0.462	0.349	0.945
Moth.educ. - Fam.wealth	2.368	4	0.592	0.448	0.774
Moth.educ. - Moth.Occup.stat.	0.710	2	0.355	0.269	0.765
Fam.wealth - Moth.Occup.stat.	1.086	2	0.543	0.411	0.664
3-way Interactions	3.790	3	1.263	0.956	0.416
Moth.educ-Fam.weal.-Moth.oc.st	3.790	3	1.263	0.956	0.416
Explained	25.346	16	1.584	1.199	0.277
Residual	171.795	130	1.322		
Total	197.141	146	1.350		

147 cases were processed  
0 cases (0.0%) were missing

---

## 2 ANALYSIS OF VARIANCE

SD score by Mother's Education, Family Wealth, Freq. of Attending Nutrition Education, Freq. of Receiving Food Supplement, and Mother's Occupational Status

---

Source of Variation	Sum of Squares	df	Mean Square	F	Signif of F
Main Effects	26.947	9	2.994	2.567	0.010
Moth.Education	2.922	2	1.461	1.252	0.290
Fam.Wealth	0.871	2	0.436	0.373	0.689
Freq.of attend.nutr.educ.	0.868	2	0.434	0.372	0.690
Freq.of receiv.food suppl.	8.339	2	4.169	3.574	0.032
Moth.Occupn. status	7.068	1	7.068	6.058	0.015
2-way interactions	47.699	32	1.491	1.278	0.178
Moth.educ. - Fam.wealth	2.868	4	0.717	0.615	0.653
Moth.educ. - Fr.attd.nut.educ.	1.588	4	0.397	0.340	0.850
Moth.educ. - Fr.recv.food.sup.	1.399	4	0.350	0.300	0.878
Moth.educ. - Moth.occp.status	1.101	2	0.551	0.472	0.625
Fam.wealth - Fr.attd.nut.educ.	9.105	4	2.276	1.951	0.107
Fam.wealth - Fr.recv.food.sup.	12.875	4	3.219	2.759	0.032
Fam.wealth - Moth.occp.status	0.542	2	0.271	0.232	0.793
Fr.attd.nut.educ.-Fr.rec.fd.sp	8.715	4	2.179	1.868	0.122
Fr.attd.nut.educ.-Moth.oc.sta.	6.664	2	3.332	2.856	0.062
Fr.recv.food.sup.-Moth.oc.sta.	1.182	2	0.591	0.507	0.604
Explained	74.647	41	1.821	1.561	0.037
Residual	122.495	105	1.167		
Total	197.141	146	1.350		

147 Cases were processed

0 Cases (0.0%) were missing

### 3 Questionnaire of Study of the Effect Socio-Economic Factors,

*Demographic Characteristics, and Maternal KAP of the Family Nutrition Improvement Programme on the Nutritional Status of Children Aged under Five Years*

#### I. Identification

1. Name of household's head :.....
2. Name of respondent :.....
3. Hamlet :.....
4. Village :.....
5. Sub-district :.....

#### II. Demographic Characteristics

6. Age of respondent (mother) :.....years/date:.....

7. Age of husband (father) :.....years/date:.....

8. Age of the youngest child :.....months/date:.....

9. Number of children in the family

9.1. still alive : male :.....

: female :.....

T o t a l :.....

9.2. had died : male :.....

female :.....

T o t a l :.....

10. Children under five who have a growth monitoring card, and  
duration since joining the nutrition programme

9.1. Name of the youngest child :.....

9.2. Duration since joined the programme :.....months

9.3. Name of older sibling :.....

9.4. Duration since joined the programme :.....months

### *III. Socio-Economic Background*

#### *III.1. Education*

11. Education of mother

(a) No education

(b) Have education, mentioned below :

---

	Primary educ. ( S D )	Secondary educ. (SMP - SMA)	Higher education (Akademi/Univ.)
Year			

---

1

2

3

4

5

---

12. Education of husband (father)

(a). No education

(b). Have education, mentioned below :

---

	Primary educ.	Secondary educ.	Higher educ.
Year			

---

1

2

3

4

5

6

---

*III.2.Occupation / Types of job*

12. Occupation / Types of job of mother (respondent)

1. Not working

2. Goverment officer

3. Army / Police

4. Factory worker

5. Home maker industry

6. Retailer

7. Farmer

8. Farm labourer

9. Semi-skilled labourer

10. Unskilled labourer

13. Occupation / types of job of husband (father)



- 1. Not working
- 2. Goverment officer
- 3. Army / Police
- 4. Factory worker
- 5. Home maker industry
- 6. Retailer
- 7. Farmer
- 8. Farm labourer
- 9. Semi-skilled labourer
- 10. Unskilled labourer

III.3.Land and House Ownership

15. Land ownership of the mother

15.1. Rice field

- (a). No
- (b) Yes, size :.....hectars/meter squares

15.2. Status of home yard (tanah pekarangan)

- (a). Rent
- (b). Private ownership, size :.....meter squares
- (c). Parents' home yard, size:.....meter squares

15.3. Status of the house

- (a). Rent
- (b). Private ownership, size :.....meter squares
- (c). Parents' house, size :.....meter squares

16. Sanitary facilities :

-----				
Status	Well	: Bath room	: Toilet	: Garbage displ.:
-----				
Permanent				
Temporary				

Non

-----

*III.4. Household's Properties Ownership*

17. Types of household's properties

-----

Items	: Number	: Value	:
			(Rupiah)
-----			
1. Bicycle			
2. Motor cycle			
3. Private car			
4. Television set			
5. Radio			
6. Tape recorder			
7. Wall clock			
8. Sewing machine			
9. Poultry			
10. Goats			
11. Cow/buffalo			
12. Piggery			
-----			

*III.5. Income*

17. Size of the last month family income :.....(rupiah)

*IV. Knowledge, Attitude - Practice of the Programme*

18. Do you know about the Family Nutrition Improvement Programme ?

(a). Yes (continued to Q. 19)

(b). No

19. If yes, can you explain the programme ?

.....

20. Do you understand the function of the growth monitoring card ?

(a). Yes (continued to Q. 21)

(b). No

21. If yes, can you explain it ?

.....

22. Do you know the aspects of the programme's activities ?

-----

Aspects	:	Know	:	Source of	:	Do not know
---------	---	------	---	-----------	---	-------------

-----

#### Information

1. Child weighing

2. Nutritional educ.

3. Providing vit.A,  
iron folate,  
oralyte salt

4. Food supplements

-----

23. Do you actively participate in the programme activites below ?

-----

Aspects	:		:	Yes	:	Duration	:	Frequency	:	No
						(months)		Regular;Irregr;		Never

-----

1. Child weighing

2. Nutrition education

3. Receiving vit.A,iron  
folate,oralyte salt

4. Receiving food  
supplements

-----

24. If you regularly or irregularly weigh child :

- what is the reason ? :.....

- what is your porpuse ? :.....

25. If you never weigh your child, what is the reason : .....

- .....
26. If you regularly or irregularly receive food supplement for your child, can you explain the usefulness ?
- (a). Yes, that is :.....
- (b). No
27. If you do not provide your child with food supplements, why is it ? :.....
28. If you regularly or irregularly attend the nutritional education, can you explain the usefulness ?
- (a). Yes, that is :.....
- (b). No
29. If you never attend the nutritional education, what is the reason ? :.....
30. How many times a day does your family have meals ?
- (a). Three times
- (b). Two times
- (c). once
31. What kinds of staple food are usually prepared ?
- (a). Rice
- (b). Cassava
- (c). Vegetables
- (d). Dried fish
- (e). Fruits
- (f). Beef, chicken
- (g). eggs
- (h). Soyabean-cake
- (i). Others, mentioned:.....
32. Do you prepared the food for the youngest child as well as for the whole family members ?
- (a). Yes, why :.....

- (b). No (cont. Q.33), why :.....
33. If no, what sort of food do you provide to the youngest child?  
.....
34. The weight and height of the youngest child
- (a). Weight :.....kilograms
- (b). Height :.....centimeters
35. How do you know the growth and development of your children,  
especially the youngest ? :.....  
.....
36. How do you know the health state of your children, especially  
for the youngest ? :.....  
.....
37. Has the youngest child been sick during the last six months ?
- (a). Yes (cont. Q. 38), mentioned :.....
- (b). No
38. If yes, what have you done ?  
.....
39. Do you breastfeed or did you ever breastfed the youngest for  
more than one months ?
- (a). Breastfeeding (cont. Q. 40)
- (b). Ever (cont. Q. 41)
- (c). Never/Not yet
40. How does it affect the growth of the youngest, if you are  
breastfeeding for at least six months ?  
.....
41. If you have ever breastfed, at what age was the youngest  
weaned ? :.....
42. What has the reason for the weaning ?  
.....